EXCAVATING ENGINEER

FOUNDED 1905

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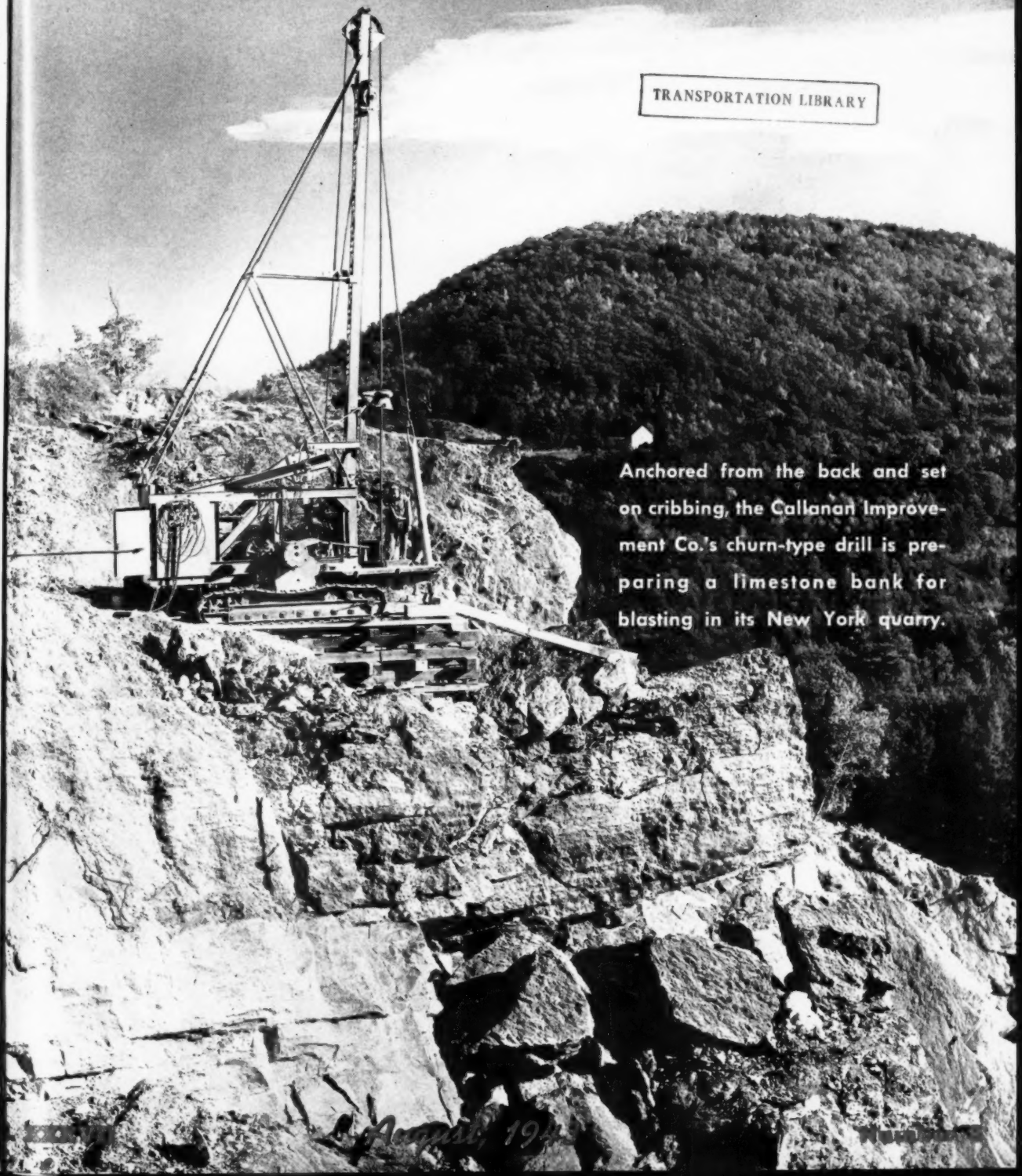

Anchored from the back and set on cribbing, the Callanan Improvement Co.'s churn-type drill is preparing a limestone bank for blasting in its New York quarry.

August 19

Keep Your Motor Humming

electric - gasoline or diesel

Now that the absolute maximum of service is most important, you'll find that you get many more hours from your blast-hole drill motor, whether it's electric, gasoline, or diesel, if you give it the attention it needs. Here are a few simple hints to help you keep 'em humming.

Keep motor clean of dust and grime.

Inspect motor regularly; check insulation and brushes on slip rings frequently.

Watch operating temperatures closely. Check windings to see that excess dust is not accumulating. Make sure that leads at the terminal box have not become damaged.

Get the help of expert, experienced electricians if you're not sure what your trouble is.

Lubricate regularly following motor manufacturer's instructions carefully.

Fix all troubles IMMEDIATELY. Don't let little ones grow into big ones.

1. Inspect engine regularly and keep it clean
2. Warm up cold engine slowly.
3. On diesel engines, check injection nozzle pressures after 300 hours if engine is new, every 1,500 hours thereafter. *Keep fuel clean* Storage tank and transfer containers or pumps should be kept free of both dirt and water
4. Flush out radiator whenever water gets dirty Be sure water added is clean.
5. Use good grade lubricating oil, following manufacturer's recommendations. Clean sump and change filter element frequently
6. Don't stop a heavily loaded engine abruptly

Get complete care and maintenance instructions from manufacturer or distributor and follow them carefully.

Keep 'em humming - Keep 'em drilling - Keep 'em fighting

Ingersoll-Rand

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

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EXCAVATING ENGINEER

FOUNDED 1905

contents

Vol. XXXVII **August, 1943** No. 8

August Advertisers

American Chain & Cable Company, Inc. .....3rd Cover
Allis-Chalmers Mfg. Co..... 395
Baker Mfg. Co. 411
Barber-Greene 397
Buckeye Traction Ditcher Co... 399
Bucyrus-Erie Company...2nd Cover, 393, 406, 408, 415
Buda Company, The 374
Caterpillar Tractor Co. 405
Detroit Diesel Engine Div. of G-M 373
Ensign-Bickford Company, The .....4th Cover
Euclid Road Machinery Co., The 413
For Sale (Classified) 424
Gatke Corporation 409
General Motors, Detroit Diesel Engine Division 373
Haiss Manufacturing Company, George 402
Hayward Company, The 408
Hercules Powder Co. 419
Independent Pneumatic Tool Company 408
Ingersoll-Rand Company 369
International Harvester Co. 370
Jahn Co., C. R. 422
Koehring Company 421
Leschen & Sons Rope Co., A. .. 423
LeTourneau Co. 401
Linn Manufacturing Corp. 400
Macwhyte Company 377
Northwest Engineering Company 376
Onan & Sons, D. W. 404
Owen Bucket Company 404
Rogers Brothers Corporation .. 406
Sauerman Brothers, Inc. 400
Standard Oil Co. of California.. 403
Templeton, Kenly Co. 410
Union Wire Rope Co. 407
U. S. War Bonds 414
War Advertising Council 391
Ward LaFrance Division 372
Wellman Engineering Co., The. 394
Westinghouse Electric Co. 375

Flamingo Washed Coal from Fairview Collieries Corp. 378

Overburden stripped has passed the million mark in several months as Flamingo Mine produces a monthly average of 90,000 tons of war-vital coal.

Phosphorus from the Red Clay of Tennessee 384

Monsanto Chemical Company removes 1,500,000 tons of overburden and mines 750,000 tons of matrix annually in producing phosphorus from deposits of low-grade phosphate.

Care and Maintenance of the Power Shovel — by George E. Miller 388

Excavating equipment company engineer gives important points on the vital subject of power shovel maintenance and gives tips on machine and engine care.

Energize Postwar Planning (Editorial) 390

Field Notes 392

Advanced Clamshell Rigging Method Saves Time. 392
Adhesive Tape Holder 394

Equipment You Ought to Know About 396

Tournapull 396
A-C. Welder 396
Flashlight Battery 396
Fabricated Pipe 396
Gas Engines 396

Shots from the Firing Line 398

Alaskan Highway is Given New Name 398
Panama Gets on Right Side of Road 398
WPB Appointment 398
North Dakota Provides for Engineers' Registration . 398
Road Progress in Southern Rhodesia 398
Review of Action Taken at A. G. C. Board Meeting.. 398
Train Enlisted Men in Shovel Operation 402
Obituaries
Samuel Reid Russell 402
Captain Arthur W. Brandt 404
Charles Edward Stuart .. 404
Frederick M. Gahagan .. 406
Amend Construction and Equipment Machinery Order 406
Authorize Construction of Scofield Project 408
Describe Structural Features of Detonators 408
Change Procedure for Equipment Disposal 409

Not in the Contract 420

Notes from the Manufacturers 422

New Trade Literature 422

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..Special Purpose

© 1943 Great American Industries, Inc., Meriden, Conn.

Military requirements called for hundreds of efficient pumpers—quickly—to combat all kinds of fires which might threaten stores and equipment.

As producers of fire apparatus for many years, it was natural that Ward LaFrance received the assignment. Standard truck chassis were converted into 500 gallon-per-minute pumpers, reinforced and equipped for their special job.

Ordinarily, it is preferable to design and build special trucks "from scratch". In this case it was practical to convert standard trucks to special-purpose use, because of the availability of the chassis units.

The moral is: When civilian motor truck purchases again become possible, put your *special* requirements up to Ward LaFrance. You'll get greater efficiency and longer useful life for every truck in your fleet. *Right now* is a good time to discuss your problems and future needs with Ward LaFrance engineers.

WARD LaFRANCE TRUCK DIVISION

★ GREAT AMERICAN INDUSTRIES ★

ELMIRA, NEW YORK

WARD LaFRANCE

Shock Loads Sabotage Wire Rope

(This is Number 15 in a series of informative articles on the conservation of wire rope. The previous article, Number 14, discussed the "Breaking-In Period" of wire rope. The present article endeavors to show how wire rope will last longer if shock loads are avoided after proper breaking in.)

* * *

LET'S AVOID SHOCK LOADS

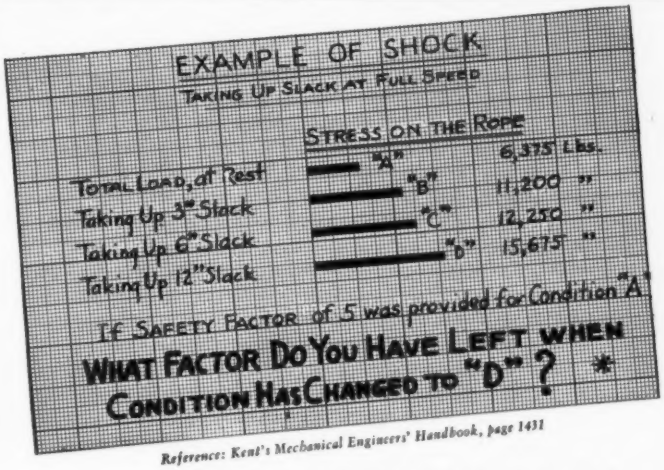
How simple things would be if there were no "ups and downs" in life. Take wire rope as an example. If operating conditions for your rope were always "peaches and cream"... if you didn't have to accelerate or speed up to meet performance expectations... if nothing went wrong to throw unexpected stresses on wire rope... if there weren't any "ifs," what a lot of unexplained things that now happen to wire rope we would never see.

But wire rope will continue to meet unexpected and unforeseen stresses. Knowing that, let's avoid *shock* loads that obviously overstress the rope.

WHAT ARE SHOCK LOADS?

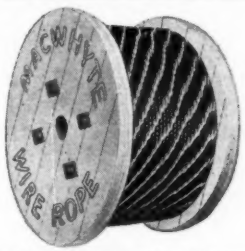
Wire ropes are made to a specified catalog breaking strength. All hoisting equipment is designed with a predetermined line pull or load at drum for loads the equipment is made to handle. *Any load above the normal working load can develop a shock load.* And shock loads today are very definitely saboteurs of the war program.

Look, for example, at the chart. There you see what happens when a given load is applied suddenly to a slack rope. The given load (in this case 6,375 lbs.) remains the same BUT the sudden impact to the rope the second that slack is taken up creates a shock load that may exceed the rope's elastic limit. The result may not be an immediate break, but, because the rope is overstressed, it often fails on another operating shift, with another operator, who does not know about the overstressed condition of the rope. When the slack to be taken up is 12", for instance, the stress on the rope *at impact* is 15,675 lbs.... or more than twice the total load at rest.



Reference: Kent's Mechanical Engineers' Handbook, page 1431

ANSWER: *6,375 x 5 = 31,875 lbs. B.S.
31,875 ÷ 15,675 = 2.03 Factor of Safety



MONARCH Whyte Strand PRE-FORMED WIRE ROPE

... Macwhyte premier wire rope, famous for its strength, toughness, and internal lubrication.

DOESN'T SAFETY FACTOR ABSORB SHOCK LOADS?

Safety factors for wire ropes vary with the type of equipment and use, as explained in article Number 4 of this series. Safety factors are based upon standard normal operations and cannot absorb the excessive shock loads, because these are beyond the normal working loads upon which the safety factor is figured.

HOW CAN YOU AVOID SHOCK LOADS?

1. Make sure there is no slack and no jerking of the rope at the start of loading.
2. Watch carefully the loads hoisted to see that they are not beyond the rope's proper working load.
3. Do not allow rope to become fouled or jammed either on the drum or by jumping a sheave.
4. Start load carefully — too fast acceleration overloads the rope. Watch how the rope "takes it" on the pick-up. Apply power smoothly and steadily.

OPERATOR ALL IMPORTANT!

Provided the equipment is in good condition and the correct rope is properly installed, the responsibility lies squarely on the operator to avoid shock loads. A good operator is a good rope's best friend, and when this friendship ceases, the rope might just as well be cut up with a torch or emery wheel. An operator can "make or break" a wire rope. There is no substitute for experience in handling rope and a desire to get the most out of it.

ALL 15 ARTICLES AVAILABLE ON REQUEST

For the benefit of those who want helpful information on how to conserve their wire rope, Macwhyte Company, its distributors, or mill depots will gladly send a set of all articles when requested on your letterhead.

RO. 680

MACWHYTE COMPANY

WIRE ROPE

2903 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Manufacturers of MACWHYTE PREformed and Internally Lubricated Wire Rope MONARCH WHYTE STRAND Wire Rope
MACWHYTE Special Traction Elevator Rope MACWHYTE Braided Wire Rope Slings MACWHYTE Aircraft Cables and Tie-Rods

• The above modern Bucyrus-Erie 1050-B, with about the greatest capacity of any stripping shovel in the world, removing an average of 35,000 cubic yards of overburden per 24-hour shift, is a big contrast to the methods used in 1916 at the first strip mine in Fulton County, Illinois, (below on opposite page) Tony Tomlianovich operated Fulton County's first strip mine about one-half mile from the present tipple site of Flamingo Mine. It has now been stripped and mined by Flamingo's modern equipment.

Overburden stripped has passed the million yard mark in several months as Flamingo Mine produces a montly average of 90,000 tons of war-vital coal

IN THE 17 MONTHS that the Flamingo Mine of the Fairview Collieries Corporation, a subsidiary of the Ayshire-Patoka Collieries Corporation, has been in production, over 12,342,000 cubic yards of overburden covering 170 acres of land to an average depth of 45 feet have been stripped in producing about one and three-quarter million tons of coal, 96 per cent of which has gone directly toward war production. In one recent month over 1,000,000 cubic yards of overburden were stripped in producing over 100,000 tons of prepared coal, a 10 to 1 ratio of overburden stripped to coal produced. This was the third month that over a million tons of overburden was stripped at the Flamingo mine.

The Flamingo is the only Illinois mine of the Ayshire-Patoka Collieries group and is the newest, most modern and greatest producer of the corporation's five mines which send an average of three and one-half million tons of war-vital coal to industry each year. The Flamingo Mine is producing an average of 90,000 tons of prepared coal a month and has hit a peak of 103,000 tons a month. The record day's production of coal to date is 4,800 tons, or 93 railroad carloads. The Ayshire-Patoka Indiana mines and their monthly production averages are as follows: Clinton Mine, Clinton, 25,000 tons; Ayshire Mine, Arthur, 75,000 tons; Patoka Mine, Winslow, 75,000 tons, and Chinook Mine, Brazil, 60,000 tons.

In prospecting the 2,400 acres of land leased at the Flamingo Mine, the area was drilled one-eight mile in a checkerboard system, with additional holes being drilled along the crop lines. On the prospecting map the number and location of each hole drilled on the property is indicated with the following information printed at each hole location; the hole number, depth of overburden, depth of coal, the sea level surface elevation and the sea level coal elevation.

Equipment used in opening the Flamingo Mine to start production included: three TD-18 International TracTracTors with Bu-

cyrus-Erie 10-yard four-wheel scrapers; two TD-14 International TracTracTors with Bucyrus-Erie 3½-yard two-wheel scrapers; a Bucyrus-Monighan 3-W dragline with a 3½-yard bucket and a Marion 450 dragline with a 1-yard bucket. In addition to this equipment a Brownhoist dragline with a 30-foot boom and 5½-yard bucket was used in the preliminary work at the mine and is still on the property and being used for ditching to provide drainage along the company's railroad track beds.

Clearing Operations

Clearing operations started at the Flamingo Mine on April 14, 1941. Twenty-three men began on the track-laying job on June 10, and four miles of track were laid and in service with the Minneapolis and St. Louis tracks by August 1. Gravel for the 23″ ballast for the track beds was hauled into the mine by truck from nearby gravel pits. About a year later, in September, 1942, one and one-half miles of track were laid from the Chicago, Burlington and Quincy road to the Flamingo Mine. Stripping at the Flamingo Mine started on December 15, 1941, and the first carload of coal was loaded on January 10, 1942, in –15° weather.

The Flamingo Mine is known for the careful preparation given to its coal which is sold through the Republic Coal and Coke Company of Chicago with branch offices in Peoria, St. Louis, Indianapolis, Cleveland, New York, Detroit, Minneapolis, Cincinnati and Milwaukee. Laboratory tests of the coal from the preparation plant are made on a routine schedule which is varied should there be loading applied on certain test orders. It is the aim of the Fairview Collieries Corporation to maintain to its customers at all times coal of good preparation, quality and uniformity of product.

Detailed daily report sheets are kept by the laboratory at the mine. These reports include daily loading, recovery, operating and laboratory records; a record of operating time losses and the causes of delays; washer adjustment log with complete washer data and proximate analysis in graph form of each size of coal produced. (See illustration of part of the daily record sheet).

Stripping Operations

The stripping operations, which are the foundation of the Flamingo Mine's ability to produce at the rate of over one million tons of coal a year after less than two years of operation, are carried on by a Bucyrus-Erie 1050-B stripping shovel with a dipper of 33-yard struck capacity and a 113-foot boom with a 70-foot tubular steel dipper handle. Each swing of the dipper of this huge stripper removes about 50 tons of earth, limestone, or shale. The average digging cycle at a 90 de-

DAILY LOADING, RECOVERY, OPERATING, AND LABORATORY RECORD

Form 76 LW. 7-42

RAW COAL INPUT	Condition	Trucks Cars	Tons	Hrs.	Min.	REMARKS
	2650 Tons Average per Coal Truck	168	4466			Coal good all day
TONS PER HR. 666	Speed 4½ to 5½					
WASHED COAL AND BY-PASSED		Cars	Tons	Hrs.	Min.	
Railroad Cars Loaded		73	3950			
By-Passed to Raw			164			
By-Passed to Boiler Dryer Stoker			14			
TOTAL WASHED		Trucks	3800			
Refuse		16	256			→ Including 8 Load Luggers
Sludge		5.5%	246			
TOTAL						
Time Operating 6:43						
Time Loss :27						
TOTAL TIME 7:00						

• A section of the large daily report sheet. The report also includes operating and laboratory records, operating time losses and causes of delays, washer adjustment log with complete washer data, proximate analysis and analytical data for each size of coal in graph form.

gree swing takes from 50 to 55 seconds.

The total weight of this mobile stripper is almost 1,400 tons. It travels, on an average, from 140 to 150 feet, each of its three eight-hour shifts a day, uncovering the four foot average depth of No. 5 vein coal seam in the Flamingo Mine. Where the overburden was less than the average 45 feet in depth, the stripper has sometimes dug and travelled to 250 feet in an eight-hour shift. An individual motor drive gives the 1050-B a fast, easy mobility with a minimum of propelling and steering stress. Each of the four large caterpillar units is individually driven by its own motor. The stripper is capable of making turns around curves or sharp turns without switching back because the individually driven cats are steered positively by hydraulic power. These units are at repose, with the pistons floating, during digging operations. Hydraulic jacks, socket-mounted at the bottom, level the machine automatically while digging and prevent moving delays that would be caused by stopping the stripper to level up on uneven veins.

The moving counterweight that raises and lowers like a big elevator at the rear of the machine and, by its counterbalance action, eliminates the deadweight lift of dipper and handle thereby making possible the maximum economical operation, brought about a unique problem at the time the stripper was assembled in the mine. The boxes of the counterweight ordinarily are ballasted with pig iron. A governmental agency priority restricted the pig iron to other use and so it was up to the erector and mine officials to provide a substitute. They used scrap railroad rail cut in sections and fitted together with alternating tops fitting into base of the next rail. Boiler plate punchings were used to fill up the largest remaining spaces in the counterweight section and silica sand dried, measured and weighed was filled in to complete the exact required ballast weight.

The maximum working ranges of the Flamingo Mine's Bucyrus-Erie 1050-B stripper are as follows: dumping height, 73'3"; dumping radius, 114'; height of cut, 98'; cutting radius, 124', and level floor radius, 78'.

Blasting Bank

In sections of highwall where limestone is present (this is about half the area now being stripped) blasting is used to prepare the bank for the shovel. To prepare for blasting the highwall, a Parmanco wheel-mounted electric-powered rotary drill is used to drill five or six horizontal holes 45 or 50 feet into the bank about 30 feet apart. From 150 to 200 pounds of gellatine dynamite are used in each blast and the five or six holes are fired together. The holes are five inches in diameter. The product of various manufacturers of explosives are being used on an experimental basis for this blasting at the present time. The limestone shelf, which averages two feet in thickness, is sufficiently fragmented for efficient dipper handling by the initial blasting so that secondary blast-

• LEFT: Rain or shine, stripping operations continue 24 hours a day. Water in the pit is from a rainfall in progress as the stripper dumps this 33-yard load of overburden. CENTER: About six tons of coal are dumped into the 33-yard Austin-Western truck-trailer with each swing of the dipper of this Marion 4121 with a knee-action front-end mechanism. RIGHT: Both power wires and drainage hose are carried over the pit road on pipe arches under which this loaded truck passes on its way to the dump.

• Left: Two Hardsocg two-wheel mounted electric rotary drills are used to prepare the coal bed for springing with small charges of pellet powder. Center: The rear trailer wheel of the coal truck is stuck in a coal bed washout hole causing delay to three more hauling units during a heavy rainfall. Right: This International I-4 wheeled tractor with Bucyrus-Erie Bulldozer is one of two handy men tractors used about the pit. A crawler-mounted International tractor with Bucyrus-Erie Bulldozer is used around the stripper.

ing of the limestone is unnecessary.

Because some of the clay and surface soil in the banks at the Flamingo Mine slides very easily, the Ledge system of stripping is used. At Flamingo the hard limestone or shale immediately above the coal is placed on the fire clay in the coal hole, immediately adjacent to the coal rib. A wall of this material is built up ahead of the stripping machine to the maximum radius. Then the softer materials are placed behind this retaining wall, the idea being that the harder material on the bottom will prevent slides.

As the stripper removes the overburden about six inches of material is left on top of the coal face so that the coal will not be exposed to rain and air and deteriorate before it is ready for loading. The protective surface also helps to prevent the trucks running on this face from breaking up the top of the coal seam. Before loading, the coal seam is carefully cleaned by a Bucyrus-Erie bulldozer mounted on an International wheeled tractor and the coal face is drilled at five or six foot intervals and loosened by small charges of slow acting Hercules or Western pellet powder. The two Hardsocg two-wheel mounted electric-powered rotary drills are used to make the 2¼-inch holes for the explosive. Charges are kept small to merely loosen the coal and do not have a shattering effect.

Loading Operations

The Bucyrus-Erie stripping shovel clears a floor over the top of the coal of about 50 feet each strip, sometimes wider, depending upon such digging factors as the height of the bank and the nature of the spoil material. It spoils this material across 40 feet of previous cut leaving 90 feet of coal width behind it. The loader, a Marion 4121 electrically powered shovel with a 7½-cubic yard dipper that is actuated through a knee-action front-end mechanism, loads 50 feet off the outside of this coal and leaves a driveway of 40 feet for the trucks to operate on. The Marion has a 36-foot boom and 19-foot dipper handle and has an overall weight of 345,000 pounds.

The mechanical propelling speed of the Marion 4121 is 1.3 miles per hour and this shovel has loaded and travelled as much as 600 feet in its seven-hour shift in the Flamingo pit when loading operations were favorable. At the present time the loader is working about two miles from the preparation plant in a pit that runs east and west and, because of the long haul, the trucks cannot be continuously spotted to take away the coal and keep the shovel moving at the 600 feet-a-day loading speed. The Marion has a rotating speed of 2.8 revolutions per minute.

Each swing of the Marion's dipper puts approximately six tons of Flamingo coal into the 25-ton, 33-cubic yard Austin-Western truck-trailer units coupled to Dart prime movers with six cylinder, 200 h.p. gasoline motors. Firestone 12.00-24, and 14.00-24 tires are used on the hauling equipment. Six of the

PERSONNEL

FLAMINGO MINE OF THE FAIRVIEW COLLIERIES CORP.

George D. Huff, Manager.
R. Pyle, Pit Foreman.
J. A. Maher, Preparation Plant Foreman.
John C. Brydon, Jr., Ass't. Prep. Plant Foreman.
Ellis Maxwell, Chief Electrician.
C. E. Hillman, Foreman of Track Crew.
Elmer M. Edwards, Weighmaster.
W. J. McCleish, Mine Office Clerk.
Otto Stout, Night Maintenance Foreman.
Loren Stone, Wesley Dierdorff, Howard McAplin, Bucyrus-Erie 1050-B Operators.
Otis Rice, Marion Operator.
Archie Mendenhall, Garage Foreman.

AYSHIRE-PATOKA COLLIERIES CORP.

R. P. Koenig, President. (Lt. Colonel in U. S. Army on Active Duty)
Robert K. Beasham, General Supt. of Mines of both Ayshire-Patoka and Fairview Collieries Corporations.
J. B. F. Melville, Vice-president and General Manager.
J. W. McDivitt, Preparation Manager.
Richard Swallow, Chief Engineer.
C. T. Buchele, Field Engineer.
G. Don Sullivan, Ass't. to President.

• The Marion loader has mucked in to start up a new stretch of the coal bed. The two drills prepare for blasting the coal bed to be loaded next. Two of the hauling trucks are loaded and headed for the preparation plant and an empty truck-trailer is making a U-turn to spot near the loader dipper. Two electric pit houses can be seen, one in the center left and the other in the left background near the high wall. A change-house is located between the two pit houses. Spoil piles are to the right.

larger 33-cubic yard hauling units are supplemented by two 15-ton Dart end-dump trucks which are used to dump gob from the preparation plant into the pit and to haul coal back from the pit to the tipple. With the present two-mile haul each of the larger hauling units carry about 28 loads each of about 26 tons of coal each seven-hour shift. Each 15-ton truck usually hauls an additional 13 loads of coal back to the hopper each seven-hour shift. The hauling road from the pit to the preparation plant is a fairly smooth, heavy-duty highway under most weather conditions, but during heavy rains the road becomes pitted and uneven due to washouts. The trucks attain a speed of 35 miles an hour from the preparation plant back to the loader in the pit and, loaded, about a 15-mile an hour average from the pit back to the hopper. As the trucks approach the loader they swing out and make their U-turn while empty to get under the dipper so that they are faced in the right direction for a quick get-away after being loaded. The roadway is wide enough for two trucks to pass each other at most places except where they pass the stripper or pass under the pipe archways that carry the power cables and drainage pipe over the pit road.

Hauling From Pit

After many delays in hauling due to broken springs in the hauling units, it was decided, as an experiment, to put shock absorbers on two of the trucks. These shock absorbers proved so successful that they were later placed on all of the trucks at the mine's own garage.

The hauling trucks leave the garage early enough so that the first truck is spotted when the loader starts at 7 a.m. and the remainder of the trucks arrive at proper intervals to keep the loader digging. The same rotation is kept up all day among the 25-ton trucks, but the smaller gob trucks come in for loading at irregular intervals after dumping their loads of spoilage from the preparation plant. The average 26 loads of coal a day carried by the gob trucks help to keep the loader working constantly during the period when the haul is longest to the preparation plant.

The Dart tractor engines on the hauling units have a crank case capacity of three and one-half gallons of oil. All trucks are drained and refilled with Ohio Oil Company oil every 50 hours of service. The main transmission of the tractors has four speeds forward and one in reverse. It is coupled with an auxiliary transmission which increases the adjustments to eight speeds forward and two in reverse. The units are equipped with air brakes and air-actuated bottom-dumping mechanisms. A separate record is kept for each hauling unit of the number of trips a day it makes, the miles it has travelled, and its fuel and oil consumption. All truck repairs are made in the company's own garage.

• George D. Huff, manager of the Flamingo Mine, has been in charge of the mine since the start of clearing operations.

Preparation Plant

The raw coal is hauled from the loading point and dumped into a 200-ton capacity concrete hopper at the preparation plant. From this hopper the coal is fed onto a 60-inch, five-ply, 42-ounce duck U. S. Rubber Company's "Matchless" conveyor belt with a horizontal length of 204 feet and a 55'6" rise between pulley centers. The belt is driven 200 feet per minute by a 75 h.p. motor. The four troughing idlers that support the belt at the receiving point are rubber covered.

The coal is discharged from

• All steel pit houses like this are located at 300-foot intervals in the pit. One of the pit tractors hauls power cable to the loader and stripper on sledges like the one seen in the foreground.

• Loaded coal car being weighed in motion as it rolls from the loader to the load-yard. Mine and weighmaster's offices are in the same building. Small building to right is M. & St. L. checker's quarters.

the main belt onto a reciprocating bar grizzly, with bars spaced on eight-inch centers. The overproduct of the grizzly continues on to a reciprocating plate picking table where large refuse is removed by hand labor. The plus eight-inch coal from the picking table joins the minus eight-inch coal from the grizzly and passes through a 30 x 60-inch double-roll, toothed, run-of-mine adjustable crusher, normally set to crush to minus six inches.

Coal from this run-of-mine crusher is conveyed to the top of the preparation plant on a 48-inch belt conveyor with a horizontal length of 160 feet. This conveyor belt is driven at 340 feet per minute by a 75 h.p. motor. It discharges onto a raw-coal shaking screen where the coal is screened into minus 2-inch and 2-inch plus. If desired the 2 x 0 can be screened to produce 1½ x 0 and back-chuted and loaded by belt into cars on track 5.

All Flamingo coal less than six inches in size is mechanically cleaned in three McNally-Norton wash boxes. One unit handles the 6 x 2-inch coal, the second unit handles the sizes below two inches and the third unit is used for re-washing and provides additional capacity so that the Flamingo washed coal is thoroughly and scientifically cleaned and of uniform quality.

After the automatically controlled cleaning of the Flamingo coal is completed, the stream of washed coal is sluiced to the washed coal sizing screen where it is again screened to remove coal less than ⅝-inch in size and sluicing water and wash water is drained. The coal over ⅝-inch in size then passes under a battery of high pressure clean water rinsing sprays where all traces of the dusty wash water are removed.

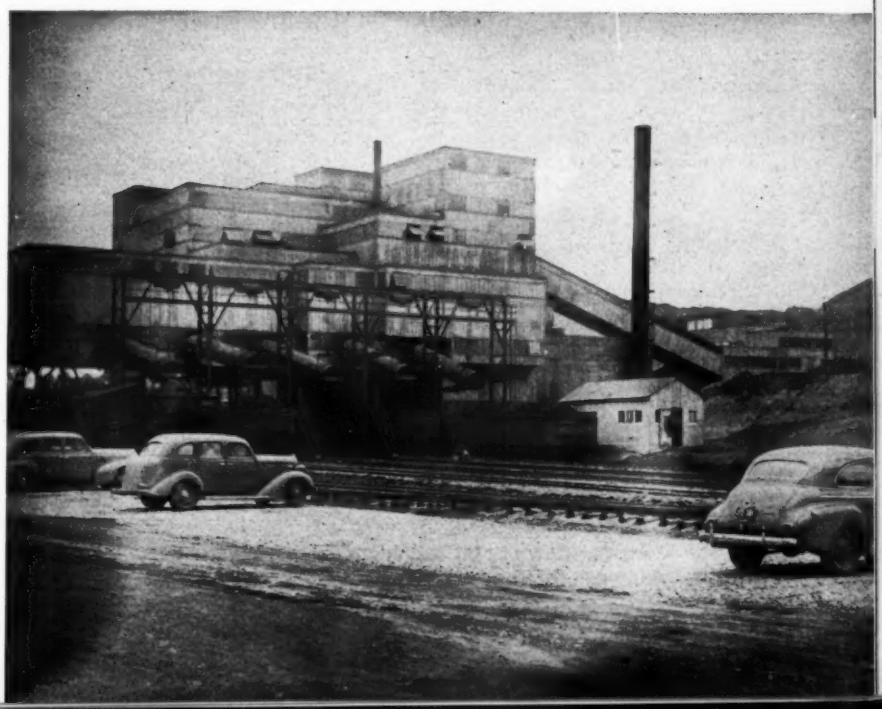
Following these operations, the coal is carefully sized to produce 6 x 4-inch washed egg, 4 x 2-inch small egg, 2 x 1¼-inch stove, or any combination of these sizes required. These sizes are then ready for mixing as required, and loaded.

The coal less than ⅝ inches in size leaves the first sizing screen and is passed over a battery of high-speed vibrating de-watering screens where the coal is rinsed and the surplus water removed. This coal, with the 1¼ x ⅝, then goes to the heat dryers where it moves slowly over a vibrating deck through which thermostatically, controlled streams of hot air are passed. The wet coal is fed slowly and uniformly onto a vibrating screen deck over which it moves and is subjected to a gentle agitating motion. These screens are enclosed by sheet steel hoods into which a stream of hot air from the furnace is blown by induced draft fans. The hot air is pulled down through the moving fuel bed and the extraneous surface moisture absorbed and carried away to be exhausted to the atmosphere. The dryer action is notably "easy" on the coal which is not tumbled around or dropped to cause breakage. Careful thermostatic control of the air stream and exact regulation of the coal feed makes possible a uniform drying action without overheating or oxidizing the coal and without degrading it.

All motors which furnish power to prepare Flamingo coal are operated by push-buttons from one

(Continued on page 412)

• Fred Greenbank, chief chemist; J. A. Maher, preparation plant foreman, and John C. Brydon, Jr., assistant preparation plant foreman (left to right) pose for the Excavating Engineer photographer.

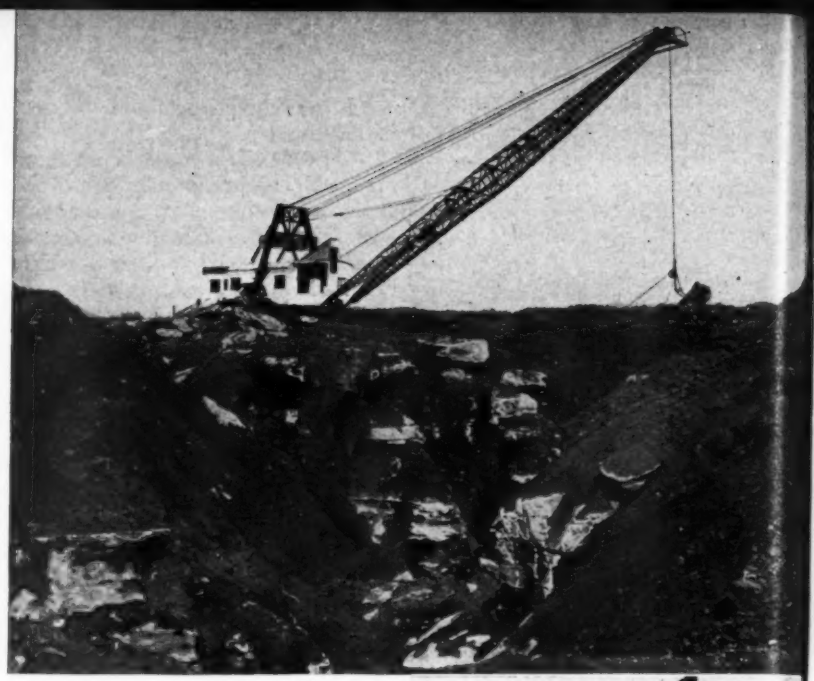


• Prepared coal is loaded to railroad cars at the preparation plant through five covered loading booms that can be raised or lowered to prevent the coal falling great distances.

Phosphorus from the Red Clay of Tennessee

Monsanto Chemical Company removes 1,500,000 tons of overburden and mines 750,000 tons of matrix annually in producing phosphorus from deposits of low-grade phosphate

By W. C. ROBBINS
Engineer of the Monsanto plants in Monsanto, Tenn.



• Monsanto's 5-W Bucyrus-Monighan with a 4 cubic yard bucket and 105-foot boom moves an average of 350 tons of overburden an hour. Limestone formations can be seen in the foreground.

HIGH GRADE phosphate has been mined in Tennessee ever since it was discovered, but until 1937 the deposits of phosphate matrix below fertilizer grade remained virtually untouched as no one had an economical means of utilizing it.

In 1937 Monsanto Chemical Company, having developed a commercial process for extracting elemental phosphorus from the lower grades of phosphate matrix, opened their furnace plant near Columbia. This plant, which extracts phosphorus from the phosphate matrix by means of large electric furnaces, was the first of its kind in the United States.

Phosphate matrix occurs in valleys called "cutters" between formations of undecomposed limestone or "horses." The matrix and limestone is overlain with clay and top soil overburden varying from 0 to 50 feet deep. The matrix deposits vary in grade of phosphate and in depth from a few feet to 40 or 50 feet. The grade of the matrix is determined by the amount of clay, silica and other diluents it contains.

Monsanto departed from the conventional equipment used in producing matrix in that an electric-powered, Bucyrus-Monighan walking dragline is used for most of the mining and stripping, while all hauling is done by means of 12-yard, bottom dump, Euclid tractor trailer units instead of tram cars.

The mines are operated 24 hours per day, seven days per week, weather conditions permitting. The weather conditions in the winter months frequently make it impossible to operate continuously so that actually the mining is done in about 300 days per year. During this time approximately 750,000 tons of matrix is mined and 1,500,000 tons of overburden removed.

Stripping and Mining

All stripping and mining is done with two machines. A 5-W Bucyrus - Monighan excavator equipped with a 105-foot boom and a 4 cubic yard bucket does all of the stripping and most of the mining. The Monighan is supplemented by a P&H 705 machine equipped with a 1½ cubic yard bucket and a 60-foot boom. It is used when the cutters become too narrow to be successfully mined with the larger machine. Since the Monighan can move overburden at a day in day out average of 350 tons per hour, it is used for moving all the overburden. The Monighan mines the matrix deposits

at varying rates depending on the depth and length of the pit. The maximum rate being about 200 tons per hour and the minimum being about 100 tons per hour. Since the smaller machine mines in narrow cutters which are at best difficult to mine, no fair mining rates can be established for it. The mining operation is carried on in successive 40-foot wide cuts. The overburden from one cut

being dumped in previously mined pits.

The phosphates as mined are divided into two grades, the separation of grades being made at 10 per cent. Materials analyzing above 10 per cent phosphorus are called "high grade" and are used as mined. Materials analyzing less than 10 per cent phosphorus are called "low grade" and are put through a washing plant for concentration. Grading is done by the pit foreman, who by feel and visual examination, can estimate within a few tenths of one per cent the grade of the matrix.

Matrix is transported from the mines to the plant in Euclid trucks equipped with bottom dump trailers. These trucks are powered with 150 h.p. Cummins diesel engines and haul a pay load of about 24,000 pounds. The maximum speed of the trucks on level ground is about 25 m.p.h. and they can climb a 12 per cent grade with a full load. Air brakes are used on both the tractors and trailers. Air is also used to accentuate the load dumping mechanism and the wheel wind which closes the trailer doors. The tractors and trailers are equipped with 21.00 x 24 tires because their large bearing surface permit the trucks to travel over poor roads. The general procedure is to build a main haulage road to the tract being mined and then build temporary roads to the draglines. The main roads are maintained with a diesel-powered patrol grader.

Since the plant operates continuously, it is necessary to maintain stockpiles of both low and high grade matrix so that during bad weather when the mines cannot be operated at full capacity, or not at all, there will be sufficient material on hand to meet production requirements.

The high grade matrix is run through a Jeffrey Hammer Mill. This mill both crushes the small amounts of phosphate rock and limestone and mixes the sands, rock and clay into a uniform product. The discharge from the Hammer Mill is delivered to the sinter plant for further processing.

• A close-up view of the Bucyrus-Monighan bucket loading a 12-ton Euclid truck powered with a 150 h.p. Cummins diesel engine.

Low Grade Matrix Treatment

The low grade matrix after being hauled to the stockpile is hydraulically sluiced over a screen with high pressure. The lumps of clay and matrix are broken up by the jets of water and pass over a screen into a collection tank located under the screen. The screen oversize consisting of clay, limestone and phosphate rock which were too large to pass through the screen are discharged onto a belt where a manual separation is made. The phosphate rock is crushed and again passed over the screen while the clay and limestone are thrown away.

• Limestone formations and overburden can be seen in this mined area of Monsanto's Tennessee operations.

The slurry in the tank, located under the screen, is pumped to the washing plant and discharged into a series of two McClanahan-Stone 30-foot log washers. These logs further break up the clay and matrix and discharge the slurry over a one-inch screen. The oversize from the screen is then crushed and discharged onto a belt. The screen undersize is discharged into a Door Classifier. This classifier recovers the coarse sands and its product is discharged onto a collection belt.

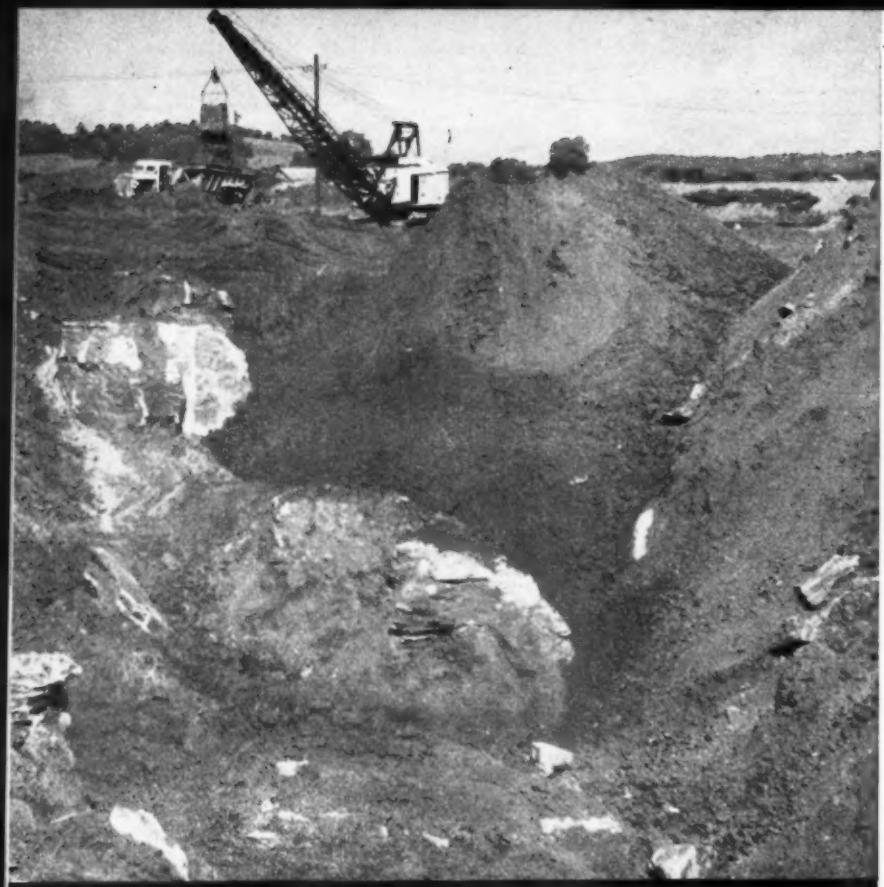
The overflow from the primary classifier passes into a Dorr Hydro-separator which retains the fine sands. The fine sands are pumped to a Dorr Bowl Classifier which recovers the sands and discharges them on the collection belt.

The products of the classifiers are known as concentrates and are delivered to the sinter plant. The concentrates and crushed high grade matrix are then mixed and burned on a traveling grate known as a sinter machine. The material discharged from this machine, called "sinter," is charged into the electric furnaces where the phosphorus is extracted by employing coke as the reduction agent.

Elemental phosphorus will burn if exposed to air and must be kept under water at all times. It has a great number of both civilian and military uses as it is used for tracers, spotter shells and bombs in times of war and goes into food products, soaps, cleansers, textiles, steel and many other common and useful products.

Interesting Repair Job

Last Fall Monsanto Chemical Company made an interesting repair job on its Bucyrus-Monighan. Company officials had anticipated a 96-hour delay to replace the lower center pintle for they un-



derstood the usual way of doing this job was to remove the 105-foot boom and fairlead, install the front erection beam and jack up the whole machine. Since the machine with ballast weighs around 200,000 pounds, this would have been a slow and laborious job. The 96-hour delay that was imminent would jeopardize the company's entire production requirements.

H. Alison Webster, Jr., mining department supervisor at the Monsanto Chemical Company's Tennessee plant, describes the method used to replace this lower center pintle in less than 24 hours under the supervision of Mr. G. C. Burgess, master mechanic of the company.

Mr. Webster says that the procedure of the crew assigned to the job under the supervision of Master Mechanic Burgess was as follows:

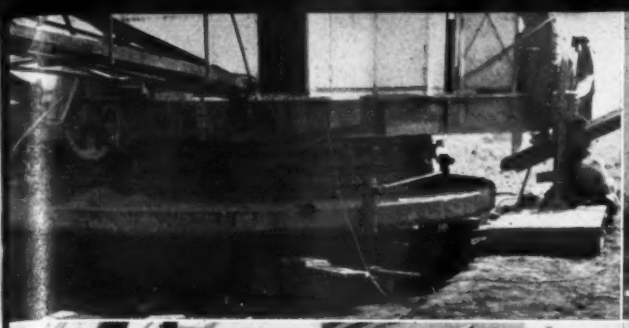
1. Dug out a level trench in hard ground the width of the circular base and 14 inches deep over which the machine was to be walked.

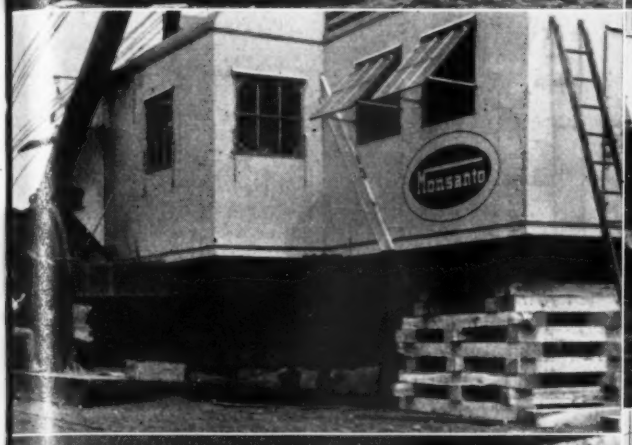
2. Filled the trench with 14" x 14" timbers, placed lengthwise. (Picture 1 shows trench, timbers having been pulled out.)

3. Layed up a mound of earth, in line with the trench to support the boom when it was lowered. This mound should be 15 to 20 feet in height and should be placed such distance away that it will be three-fourths of the length of the boom from the machine. (See picture No. 2.)

4. Walked the machine over the trench, swung the boom over the earth pile and took one-half

• Below: General view of Monsanto Chemical Company's plant. Lower right: The furnace plant is a spectacular and impressing sight during night operations.





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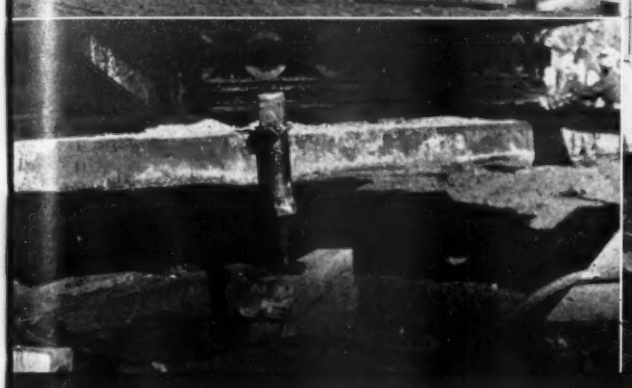

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• In changing the lower center parts on the Bucyrus-Monighan, the procedure, as pictured above was as follows: (1) After an level trench was dug the width of the circular base and 14 inches deep, it was filled with 14" x 14" timbers, placed lengthwise and the machine was walked over the trench. The timbers are then pulled out. (2) Mound of earth was keyed up to support the lowered boom. Pictures (2) and (3) also show cribbing placed under rear of machine to take part of weight. (3) Chocked the walking cam and other walking machinery. (4 and 6) A tractor with chain and cant hooks was used to pull the timbers from under the machine. (5) One of the set of four jacks spaced equally around the circular rub so that the base could be uncoupled and lowered the required distance to give clearance for removal of lower center plate.

step, stopping the walking cycle when the rear end of the cab was at its maximum height and weight of machine was carried by pontoons. (This is also shown in picture No. 1.) Chocked the walking cams (the 6" x 8" chock is shown in picture No. 3 sticking

(*Continued on page 409*)

Care and Maintenance of the POWER SHOVEL

Excavating equipment company engineer gives important points on the vital subject of power shovel maintenance and gives tips on machine and engine care

By GEORGE E. MILLER

(Chief Engineer, Buckeye Traction Ditcher Company, Findlay, Ohio)

T NO PERIOD IN OUR industrial history has there been a greater necessity for conserving power shovels and similar equipment through constant care and intelligent maintenance.

Production of power shovels for commercial use has practically ceased, and no one knows when it will be resumed. Meanwhile, all work not under the direction of our armed forces must be carried on with the equipment now available for private jobs. How may this best be done? My first suggestion to owner and operator is to get acquainted with your machinery.

Because of its brute strength and ability to go almost anywhere on powerful crawlers, the uninitiated look upon the modern power shovel as something that will slug its way along until it falls apart of old age. I am afraid that a great many owners and operators have much the same idea. When the man who runs one really appreciates the careful adjustments and close relationship of parts in a shovel, he will see the need for redoubling his maintenance operations if the machine is to remain in use.

It will be possible here to touch only upon a few high spots of the vital subject of maintenance. However, I cannot impress upon you too strongly that careful attention to minor, and often overlooked, service operations will materially lengthen the life of your unit.

That proper lubrication is vital to upkeep is recognized by all makers of earth-moving equipment, and each manufacturer provides charts on which all lubrication points are clearly indicated, together with the type of lubricant to be used at each point and the interval between lubrication periods.

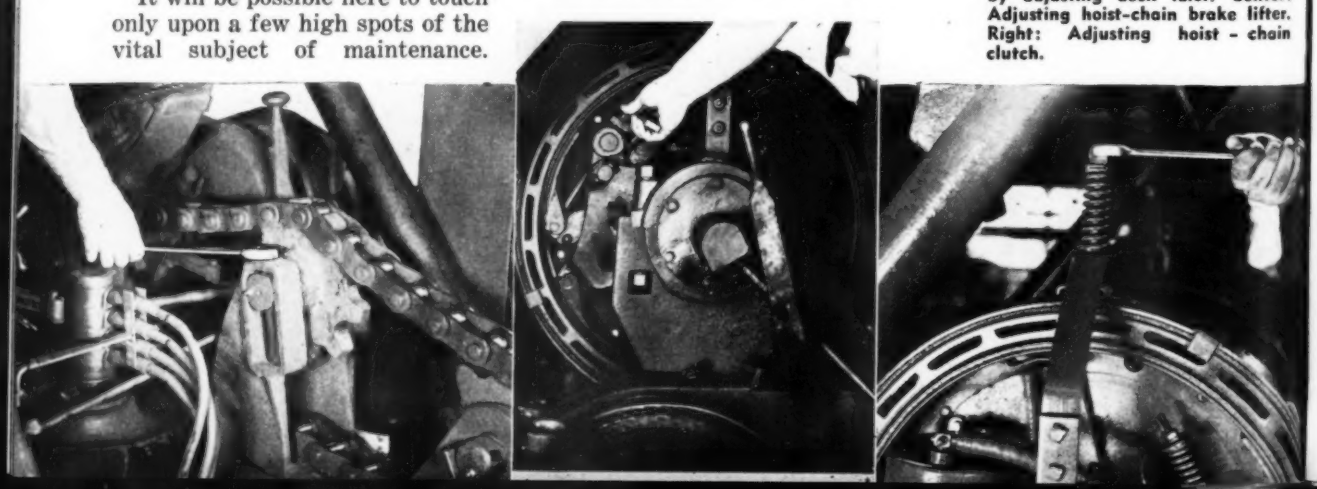
Realizing that the many grades and classes of lubricants required reduction and simplification, the War Department, after much study and many tests and experiments, set up a modified lubrication program calling for three oils, five greases and two gear lubricants which, it is believed, will suffice for the needs of all heavy machinery and permit uniformity of manufacture by the different refiners.

Broken down, these army specifications call for three general purpose greases, a water pump grease and a wheel bearing grease, two gear lubricants, SAE 90 and SAE 80, and three engine oils, SAE 10, SAE 30 and SAE 50. Although some deviation from this list was formerly deemed advisable for the most efficient performance of some particular machine, it appears to be the consensus of opinion among most purveyors of equipment of the power shovel type that the kinds of lubricants enumerated will be adequate for almost all normal lubricating purposes. I believe that this action of the army engineers means a step toward greater uniformity in lubricating specifications and a decided reduction in the type and grades that will be used after the war.

Simplify Lubricants

The engineers point out that while the War Department Lubrication Program is intended to simplify lubricants for army equipment to the lowest point consistent with efficient operation, there will actually be more than the ten mentioned lubricants available in the field. This is because the so-called standard lubricants will not completely perform the specialized functions of certain special fluids required for hydraulic brakes, shock absorbers and the like. However, with the trend toward simplification fully understood by refiners and lubrication engineers, it may be assumed that designs of the future will take into consideration the justifiable limitations imposed by the War Department, and some of these special fluids may be eliminated eventually.

Another innovation introduced by the engineers in connection with lubrication is the employment of eight hours as a time



• Left: Tightening crowd chain by adjusting deck idler. Center: Adjusting hoist-chain brake lifter. Right: Adjusting hoist - chain clutch.

unit. This method provides for proper and regular lubrication at the end of each eight-hour interval of use. In peace time, 40 to 60 hours may constitute a working week. On a military project or on two and three shift private operations, a piece of earth-moving equipment may be in operation 24 hours a day. When this happens, the operator finishing the shift greases all points calling for eight-hour service before turning the equipment over to his successor.

Continuous and thorough inspection of all parts is another military mandate that the civilian operator will do well to follow. Frequent testing and scrutiny will anticipate many of the things that go wrong with a shovel. When proper adjustments are not made, wear increases and the time when you will have to repair or replace the part or assembly grows less. If indications point to something amiss, stop the shovel at once, find out what is causing the trouble and correct it. Here is evidence that an intimate knowledge of your machine will increase its life and usefulness for only study and experience can teach you to recognize the little things which are the forerunners of greater mishaps.

Make sure that all chains are maintained at the proper tautness, and see that they are well lubricated at all times. This is especially true of the crawler drive chains and the chain-driven boom hoist. The tightness of the crawler belt should also be watched closely.

Repairs on clutches and brakes should be made carefully and always with the proper tools.

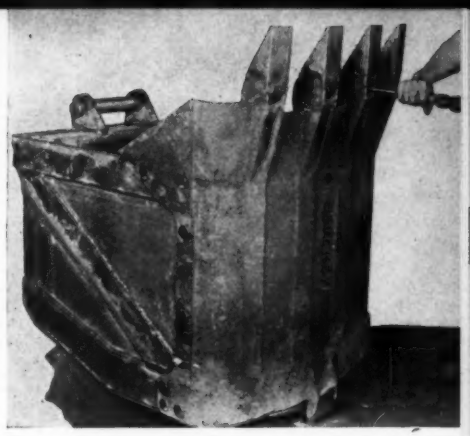
When assemblies are taken apart, adjacent and related assemblies should be checked for wear at the same time. They are usually much more accessible at that time.

Correct Reassembly Important

It is vital that all keys, pins, seals and other small items be restored in the same way and to the exact position from which they were taken. Careless reassembly after a repair or a replacement has been made can often do more damage than the original disorder. When disassembling a unit, all parts must be plainly marked, not only to facilitate reassembly, but to prevent injury from faulty positioning. Having a piece of mechanic's chalk handy may save hours of guesswork. Mark each piece and each position and you won't have to resort to the "trial and error" method.

Bear in mind that the job a shovel does is a heavy one, and no matter how strong the materials used in building it, or the care and accuracy used in connecting and adjusting the various sections, stress and wear will eventually take their toll. Especially is this true in the case of buckets and dipper teeth. To maintain your front-end equipment at a high working standard, watch the cutting edges. A shovel, trench hoe, clamshell or dragline cannot dig effectively with dull, worn teeth. Teeth can be removed and replaced easily. However, if new teeth are not available, the old ones can be built up by welding or, if badly worn, by tacking on a piece of repointer bar and then welding.

In connection with the shovel boom, check sheaves and cable frequently. Make sure that the saddle block does not wear loose, and watch the bushings of the shipper shaft. Proper adjustment at all times will prolong the life



• Removing dipper teeth for repair or replacement.

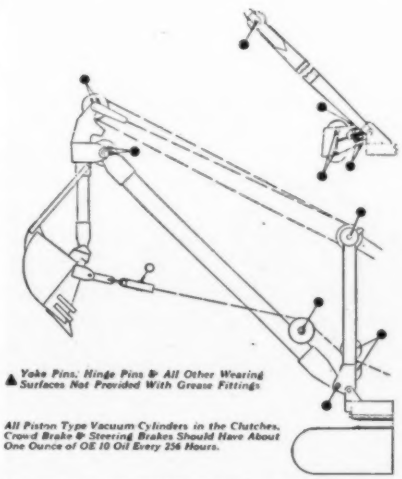
of the crowd chain which drives the dipper stick.

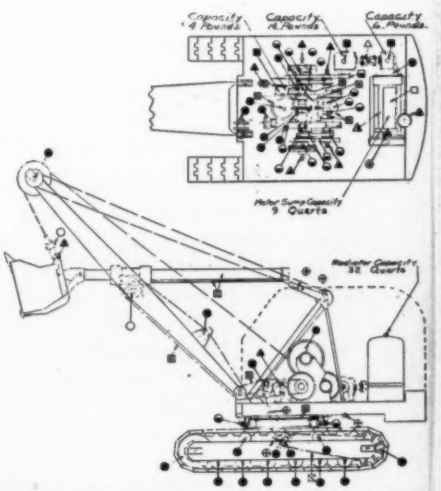
When the chain on your dragline shows signs of wear, it should be reversed because the greater wear comes on the bucket end. Mud, sand or other materials that you are digging should be kept out of sheaves, fairlead and other places where they might act as abrasives.

It is also well to remember that a dragline is a digging tool and not to be used for cracking concrete slabs or pulling up stumps. It should also be lowered to a proper digging position instead of being allowed to drop on its nose or arches, and action extremely hard on front hitch plates, arches and the entire machine; a careless action for which there is no excuse.

Bear in mind, too, that when a clamshell has been used under water, the felt seals of the bucket should be changed every six

(Continued on page 410)


▲Yoke Pins, Hinge Pins & All Other Wearing Surfaces Not Provided With Grease Fittings
All Piston Type Vacuum Cylinders in the Clutches, Crowd Brake & Steering Brakes Should Have About One Ounce of OE 10 Oil Every 256 Hours.



○	Alemite Fitting	4 Hrs.	Below +32°F. CG-0 Above 32°F. CG-1	◒	Alemite Fitting	1024 Hrs.	Below +90°F. WB-2 Above +90°F. WB-3
●	Alemite Fitting	8 Hrs.	Below 32°F. CG-0 Above 32°F CG-1	□	Drain & Refill Every 64 Hrs. in Extreme Dusty Conditions Every 32 Hrs.		Above +32°F. OE 30 Below 32°F. OE 10 Extreme Heat OE 50
◍	Alemite Fitting	64 Hrs.	Below 32°F. CG-0 Above 32°F CG-1	■	Drain & Refill Every 1024 Hrs.		Above +32°F. GO-90 Below +32°F GO-80

▣	Apply with Brush	64 Hrs.	CW	▲	Oil	8 Hrs.	OE 30
▣	Pour through Inspection Hole	64 Hrs.	CW	▲	Air Cleaner	Clean & Service Every 8 Hours	
△	Oil	512 Hrs.	GO 90	▲	Magneto Starter Gen'r	64 Hrs.	OE 30

• A typical power shovel lubrication chart. This chart is issued by the Buckeye Company for its Clipper Model machine.

Energize Postwar Planning

Is there a backlog of public and private works projects in your work area ready to bid, and let, and go to work on, come peace day? If not, isn't it time for you to do a job of sales campaigning to get these ready?

When we plan for war it is best that we plan for a long war, but when we plan for peace it is wise to plan for an early peace just in case. This isn't the counsel of overconfidence, it's just plain horse sense, just as it is to plan our wartime activities and production for a long and tough fight.

If we are to plan for an early peace, isn't it about time that our postwar plans were brought forward from the conversational stage and energized into specific projects with right-of-ways optioned or purchased, final specifications approved, bid papers drawn and everything in readiness for action the day the conflict ends?

The closer we are to being ready to start immediately on useful construction projects, both public and private, the nearer we are to eliminating postwar unemployment without resorting to starling-shooting, leaf-raking and other made-work expedients.

No one wants construction plans to degenerate into a mere tonic for our expected social and economic ills. The real purpose of public works is to provide a maximum of public service for a minimum outlay of labor, materials, equipment and public funds. Not only should public works provide useful direct employment of labor, but, like private construction projects, should also provide investment in materials and equipment which multiply their employment potentialities manyfold and further, develop new opportunities for farms, industry, and trade to continue service to our economic welfare throughout the entire period of their useful life.

Industry with its conversion problems, cannot hope to provide enough jobs in the beginning of the postwar era. Public construction, starved by the war years, should be in a position to take up the slack and provide some of the impetus necessary to get industry moved into peacetime high gear. Material and equipment orders, ready to be placed immediately after the war, will not only give immediate direct employment, together with employment in the supplying material and equipment industries, but will also result in orders for raw materials, sub-assemblies and accessories to employ many thousands of the men who will be released from war industries and the armed forces the day peace comes. Following the simple ABC's of economics, the purchasing power provided by these pay rolls will employ thousands more in the consumer-goods industries.

Only that public construction which has a definite and sound economic purpose and which can be economically carried out by the efficient contract system should be considered. Highways and other public works should be carried on as an investment and not as a expenditure. It is also important that federal aid for public construction be equitably distributed on a scientific basis rather than as a method of giving a few men political opportunities.

With all the conversation and arguments we hear about postwar planning one would be led to think that it was a very complex and difficult program. In reality postwar planning is very simple. In fact, it is nothing more than normal planning procedure carried through by engineers and construction men countless times before, with but one difference—postwar planning must be done without any definite date in mind as to when actual construction will start. The preliminaries—authorization of the project, land acquisition, appropriation of funds for detailed plans, actual preparation of plans and specifications, means of financing construction, and any legal aspects of the projects—are the same as always.

The principle and important thing to remember about proper postwar planning is to have the details completed so that work can be started immediately anytime that peace comes—be it next month, next year or in several years. Even a modest plan put into action and ready to start on the day that peace comes is of far more value than the most elaborate plan that, because of its complexities, will meet the dawn of peace day still in its conversational stage.

Do what you can in your own business to take up the slack come peace day—talk to your friends and neighbors about the importance of energizing postwar planning. Bring pressure on the public works officials and engineers, to whom you must look for postwar work, to get it ready to release when the last gong rings and the war is done.

IF YOU'RE MAKING MORE MONEY

...WATCH OUT!

WE WANT TO WARN YOU, before you read this page, that you've got to use your head to understand it.

We also want to warn you that—if you don't bother to read it carefully enough to understand it—you may wake up after this war as poor as a church mouse.

• • •

This year Americans are going to make —minus taxes—125 billion dollars.

But this year, we civilians are not going to have 125 billion dollars' worth of goods to spend this on. We're only going to have 80 billion dollars' worth. The rest of our goods are being used to fight the war.

That leaves 45 billion dollars' worth of money burning in our jeans.

Well, we can do 2 things with this 45 billion dollars. One will make us all poor after the war. The other way will make us decently prosperous.

This way the 45 billion dollars will make us poor

If each of us should take his share of this 45 billion dollars (which averages approximately $330 per person) and hustle out to buy all he could with it—what would happen is what happens at an auction where every farmer there wants a horse that's up for sale.

If we tried to buy all we wanted, we would bid the prices of things up and up and up. Instead of paying $10 for a dress we're going to pay $15. Instead of $5 for a pair of shoes we're going to pay $8.

This bidding for scarce goods is going to raise prices faster than wages. Wages just won't keep up.

So what will people do?

U. S. workers will ask for more money. Since labor is scarce, a lot of them will get it. Then farmers and business men who

feel the pinch are going to ask more money for their goods.

And prices will go *still higher*. And the majority of us will be in that same old spot again—only worse.

This is what is known as Inflation.

Our government is doing a lot of things to keep prices down . . . rationing the scarcest goods, putting ceiling prices on things, stabilizing wages, increasing taxes.

But the government can't do the *whole job*. So let's see what *we* can do about it.

This way the 45 billion dollars will make us prosperous

If, instead of running out with our extra dough, and trying to bid on everything in sight, we buy only what we absolutely need, we will come out all right.

If, for instance, we put this money into (1) Taxes; (2) War Bonds; (3) Paying off old debts; (4) Life Insurance; and (5) The Bank, we don't bid up the prices of goods at all. And if besides doing this we (6) refuse to pay more than the ceiling prices; and (7) ask no more for what we have to sell—no more in wages, no more for goods—*prices stay where they are now.*

And we pile up a bank account. We have our family protected in case we die. We have War Bonds that'll make the down payment on a new house after the war, or help us retire some day. And we don't have taxes after the war that practically strangle us.

Maybe, doing this sounds as if it isn't fun. But being shot at up at the front isn't fun, either. You have a duty to those soldiers as well as to yourself. You *can't* let the money that's burning a hole in your pocket start setting the country on fire.

★ ★ ★

This advertisement, prepared by the War Advertising Council, is contributed by this Magazine in co-operation with the Magazine Publishers of America.

KEEP PRICES DOWN!

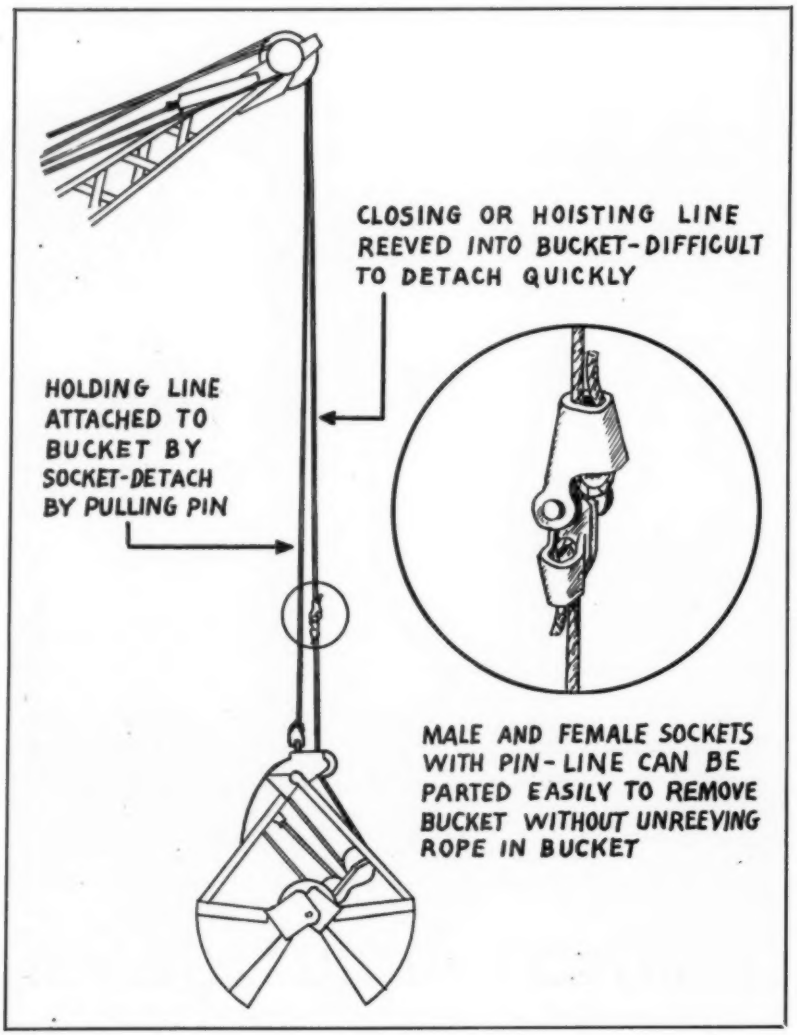
Use it up
Wear it out
Make it do
Or do without

Field NOTES

Advanced Clamshell Rigging Method Saves Time

More and more contractors at home as well as the fighting construction forces overseas, are taking up the idea of rigging clamshell buckets in advance of their actual use and keeping them rigged when they are not busy. On jobs where a clamshell bucket works intermittently, this simple scheme saves rigging time and helps to show more effective working hours for the crane involved.

A contractor on a U. S. Naval base recently demonstrated the principle on a bridge job. Here the crane, a Lorain 69 diesel with a 60-foot boom, was being used to drive two rows of AP type steel sheeting. As each section of the pile cutoff was finished it was necessary to excavate soft mud out of the pier structure with a clamshell bucket. By having the bucket rigged continuously in such a way that it could be picked up in a few minutes, dropped, and the 8,000-pound McKiernan-Terry pile hammer picked up without delay, many minutes were saved. This contractor flies an Army-Navy "E" pennant for something considerably more important than standing by with a crane engine idling, waiting for a ground crew to finish hooking up a rusty clam.


CLOSING OR HOISTING LINE REEVED INTO BUCKET-DIFFICULT TO DETACH QUICKLY
HOLDING LINE ATTACHED TO BUCKET BY SOCKET-DETACH BY PULLING PIN
MALE AND FEMALE SOCKETS WITH PIN-LINE CAN BE PARTED EASILY TO REMOVE BUCKET WITHOUT UNREEVING ROPE IN BUCKET

Under the system, the clamshell bucket is rigged in the usual way, leaving 35 feet of surplus holding cable after the bucket is in the closed position. An eye is spliced in the end of this 35-foot tail, and when the bucket is picked up for use this eye catches a clevis on the end of the clamshell closing line leading over the boom point sheave from the drag drum. Male and female sockets with pins so that the line could be parted easily to remove the bucket without unreeving the rope in the bucket would also serve in place of the eye and clevis. The holding line is hooked to the bucket as usual when it is picked up. The great saving of time is made by not having to reeve the cable ends through the sheaves on the clam bucket.

The travel of the socket on the closing or hoisting line is limited by the boom point, as the socket will not pass over the boom point sheave. About 25 feet of closing cable must be hauled in to close the bucket, hence the socket in the closing or hoisting line must be at least 25 feet above the bucket. As a result, the closed bucket cannnot approach closer than 25 feet to the boom point sheave. That is the reason the 35 feet of surplus holding cable is left after the bucket is closed before the eye or socket is spliced into the cable.

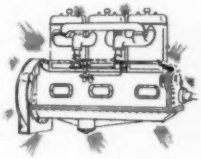
The advanced rigging system works best if the boom is long or sufficiently inclined to get height enough so that the bucket can be pulled up enough before the eye or socket reaches the boom point sheave. This rigging will not work with a high dump unless the boom is very long. For most purposes on fast-moving construction jobs, however, and for all shallow excavations up to 15 feet deep, the advanced rigging will save time.

Clam closing imposes unusually severe bending stresses in the rope as it passes under strain over the small sheaves in the bucket closing arms and so preformed rope is used because preformed rope is manufactured by a process which preshapes each wire to the same helical shape it works under, and thus there is less internal torsional stress present.

The contractor whose bridge job on the naval base was cited as an example of the prerigged clamshell system, used 8 x 19 Seale,

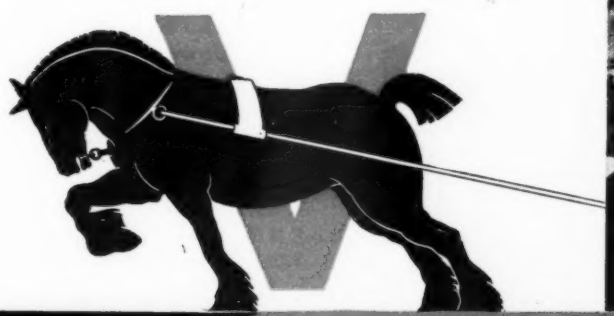
Keep Your Horses Pulling on the Victory Road

You'll get the most efficient excavator performance when all the "horses" in your engine are pulling full strength. Here are a few hints that may help keep that engine humming.



1. Inspect engine regularly and keep it clean.
2. Warm a cold engine up slowly (don't use choke more than is absolutely necessary).
3. Don't stop a heavily loaded engine abruptly. Let it idle a little to cool off before shutting down.

4. Flush radiator out whenever water gets dirty. Be sure water added is clean. Never add cold water to an overheated engine.
5. Use good grade lubricating oil. (Follow manufacturer's recommendations). Clean sump and change filter element frequently (every other oil change is good practice).
6. Keep proper amount of water in battery. (Add water when starting, never when shutting down). Keep terminals covered with grease to avoid corrosion.
7. In gasoline engine, keep spark plugs and distributor points properly adjusted and clean.
8. In diesel engine, check injection nozzle pressures after 300 hours on a new engine, every 1500 hours thereafter. KEEP FUEL CLEAN. Storage tank and transfer containers or pumps should be kept free of both dirt and water.
9. Get complete care and maintenance instructions from manufacturer or distributor, and follow them carefully.



Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

regular lay preformed plow steel cable, for clam closing.

Another example of the prerigged clamshell method is found in use in Imperial, California, where the Imperial Irrigation District maintains the irrigation facilities for half a million acres of land, as well as hydroelectric plants on the All-American canal. The district, under Mr. M. J. Dowd, chief engineer and general superintendent, uses the scheme on many of its shallow excavations where prefabricated steel check structures have to be excavated, then picked up and placed in canals. The district uses preformed rope for all drag cables as well as on clam closing work.

Now that manpower is scarce time is precious. And with a war still to be won, the contractors who are using this little scheme are finding that the time saved in rigging is not only paying for the cable used, but is keeping the machines busy a small percentage longer. And in the final analysis, that is what is important.

By R. P. Day

Adhesive Tape Holder

When applying adhesive tape to a simple emergency bandage the adhesive tape spool is a mean thing to keep picking up to cut off and remove the tape. Frequently the left hand has all it can do to hold portions of a rough bandage in place.

• One hand can pull off, cut off, and take off the tape as it is used and applied with this easy adhesive tape holder.

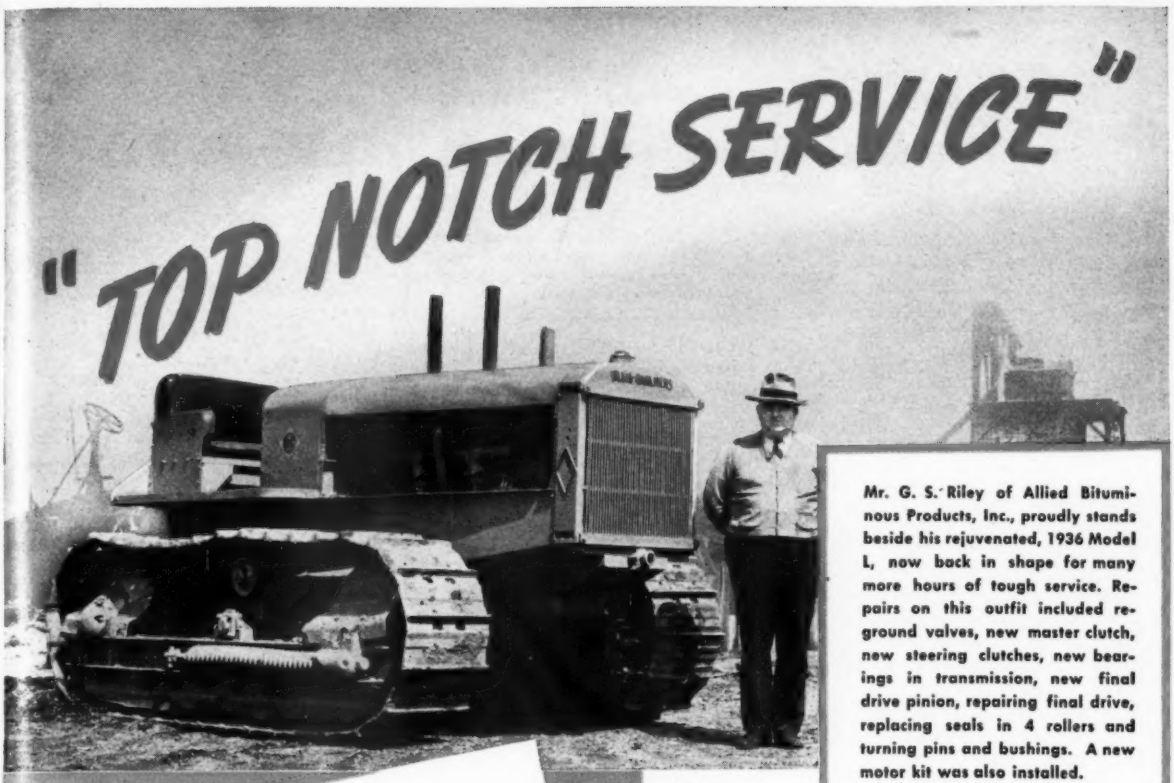
A common shower curtain spring ring will hold the tape spool and snap ring and thus leave a hand free to pull off, cut off, and take off the tape.

Put a small screw-eye at such place where the tape may be most frequently used. Place the shower curtain spring ring through the screw-eye and then use the snap ring over the spool as indicated in the accompanying photograph. The large part of the ring, of course, goes through the spool hole, the snap ring drops loosely down over it, but stays in the position shown in the picture.

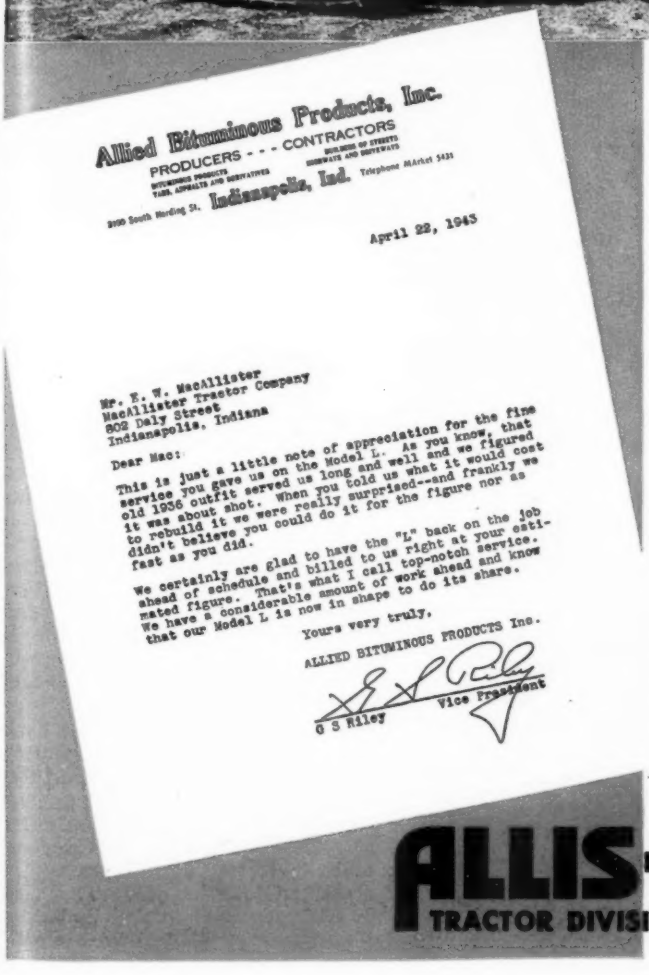
After removing the spool ring you can pull directly down on the tape with the spool unwinding away from you. When you have enough tape, lightly stick one end to the ring. Cut off the other end with a scissors and pull the piece off the ring. When through using, put on the ring and let the spool hang. The shower curtain ring opens up at the top and they are very easy to procure at any household counter.—*Frank W. Bentley, Jr.*

WILLIAMS Buckets
BUILT BY WELLMAN
MULTIPLE ROPE AND POWER ARM • POWER WHEEL • DREDGING • STEEL MILL • DRAG-LINE BUCKETS
⅜ to 16½ yds. capacities
BUILT TO LAST-
Welded Rolled Steel Construction Means Great Strength and Longer Wear!
and MOVE DIRT FAST!
Williams Buckets are balanced and designed for digging power and fast action. An operator can make time with a Williams Clamshell or Dragline.
THE WELLMAN ENGINEERING CO.
7002 Central Ave., Cleveland, O.
Send for free bulletin covering types of buckets for your particular requirements. It shows details of design and many exclusive features that clearly prove why your next bucket should be a Williams.
WILLIAMS Buckets
ARMY E NAVY

"TOP NOTCH SERVICE"



Mr. G. S. Riley of Allied Bituminous Products, Inc., proudly stands beside his rejuvenated, 1936 Model L, now back in shape for many more hours of tough service. Repairs on this outfit included reground valves, new master clutch, new steering clutches, new bearings in transmission, new final drive pinion, repairing final drive, replacing seals in 4 rollers and turning pins and bushings. A new motor kit was also installed.



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BITUMINOUS PRODUCTS TARS, ASPHALTS AND DERIVATIVES
BUILDERS OF STREETS HIGHWAYS AND DRIVEWAYS
2000 South Harding St. Indianapolis, Ind. Telephone MArket 5431

April 22, 1943

Mr. E. W. MacAllister
MacAllister Tractor Company
802 Daly Street
Indianapolis, Indiana

Dear Mac:

This is just a little note of appreciation for the fine service you gave us on the Model L. As you know, that old 1936 outfit served us long and well and we figured it was about shot. When you told us what it would cost to rebuild it we were really surprised--and frankly we didn't believe you could do it for the figure nor as fast as you did.

We certainly are glad to have the "L" back on the job ahead of schedule and billed to us right at your estimated figure. That's what I call top-notch service. We have a considerable amount of work ahead and know that our Model L is now in shape to do its share.

Yours very truly,

ALLIED BITUMINOUS PRODUCTS Inc.

G S Riley Vice President

HANDLING repair or rebuild work the way it should be handled . . . getting the job finished on time . . . and at lowest possible cost . . . that's Top Notch Service! It's the kind an Allis-Chalmers dealer recently gave to Allied Bituminous Products Company on a tractor overhaul job . . . the kind your A-C dealer is equipped to give to you.

His factory-trained mechanics are skilled in their work . . . have specially adapted tools for efficiently tearing down tractors and other road-building equipment and for reassembling them in a hurry. His shop is equipped with hoists for quickly lifting heavy sections. Machining facilities are readily available. Working quarters are of the best—ample and clean—assure careful handling of delicate Diesel parts. Replacements are genuine Allis-Chalmers parts. Welding worn or broken sections, cleaning and painting are all a part of his service.

His experienced judgment in sizing up a job enables you to know beforehand about what has to be done and what it will cost. Why not have your Allis-Chalmers dealer check YOUR equipment NOW . . . it will pay you many times over! Take care of your machinery and it will take care of you.

ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE, WIS., U.S.A.

Equipment you ought to KNOW ABOUT

For further details about the equipment on this page please write to the manufacturer, mentioning Excavating Engineer.

Tournapull

Manufacturer: R. G. LeTourneau, Inc., Peoria, Illinois.

Claims: The new D tournapull is revolutionary in the earthmoving field because it can be airborne and even crash-landed for use on wartime fighting fronts. Equipped with a 2-yard Carryall scraper and Tiltdozer, the unit has a "flying" weight of only 3¼ tons. Large, pneumatic rubber

tires give the unit ample flotation on soft surfaces and enable it to carry heavy loads over concrete roads and runways. It possesses speeds up to 18.8 miles per hour. The D tournapull affords unusually quick, one-man operation.

Flashlight battery

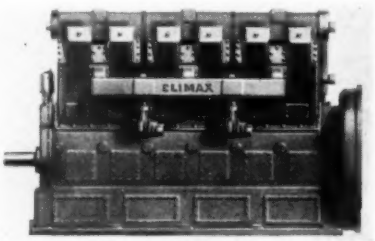
Manufacturer: Ideal Commutator Dresser Company, Sycamore, Illinois.

Claims: This type of rechargeable storage battery was introduced about three years ago for industrial service and is now proving its value wherever flashlights are required in regular use. Small enough in size to fit all popular two cell 1¼" size D flashlight cases it has proved through actual heavy duty service to be dependable and economical. Each battery can replace up to 400 or more dry cells. This is possible by recharging it at convenient periods.

Gas engines

Manufacturer: Climax Engigineering Company, Clinton, Iowa.

Claims: This new V-12 Blue Streak engine has a normal speed range of 600 to 1200 r.p.m. and a brake horsepower of 435. The V-12 may be used for rock or oil drilling, operating large pumps and compressors, driving mining and construction machinery and, with suitable generators becomes a low-cost means of generating electric power. The engine will deliver peak power on natural gas, butane, gasoline or other fuels. Each cylinder has two spark plugs. These provide increased power output and remove the possibility of ignition failure. The V-12 is available in two bores. Model V-335, 6½" bore and 7" stroke develops 375 horsepower at



1200 r.p.m. Model V-390 with the 7" bore and 7" stroke develops 435 horsepower at 1200 r.p.m.

A. C. welder

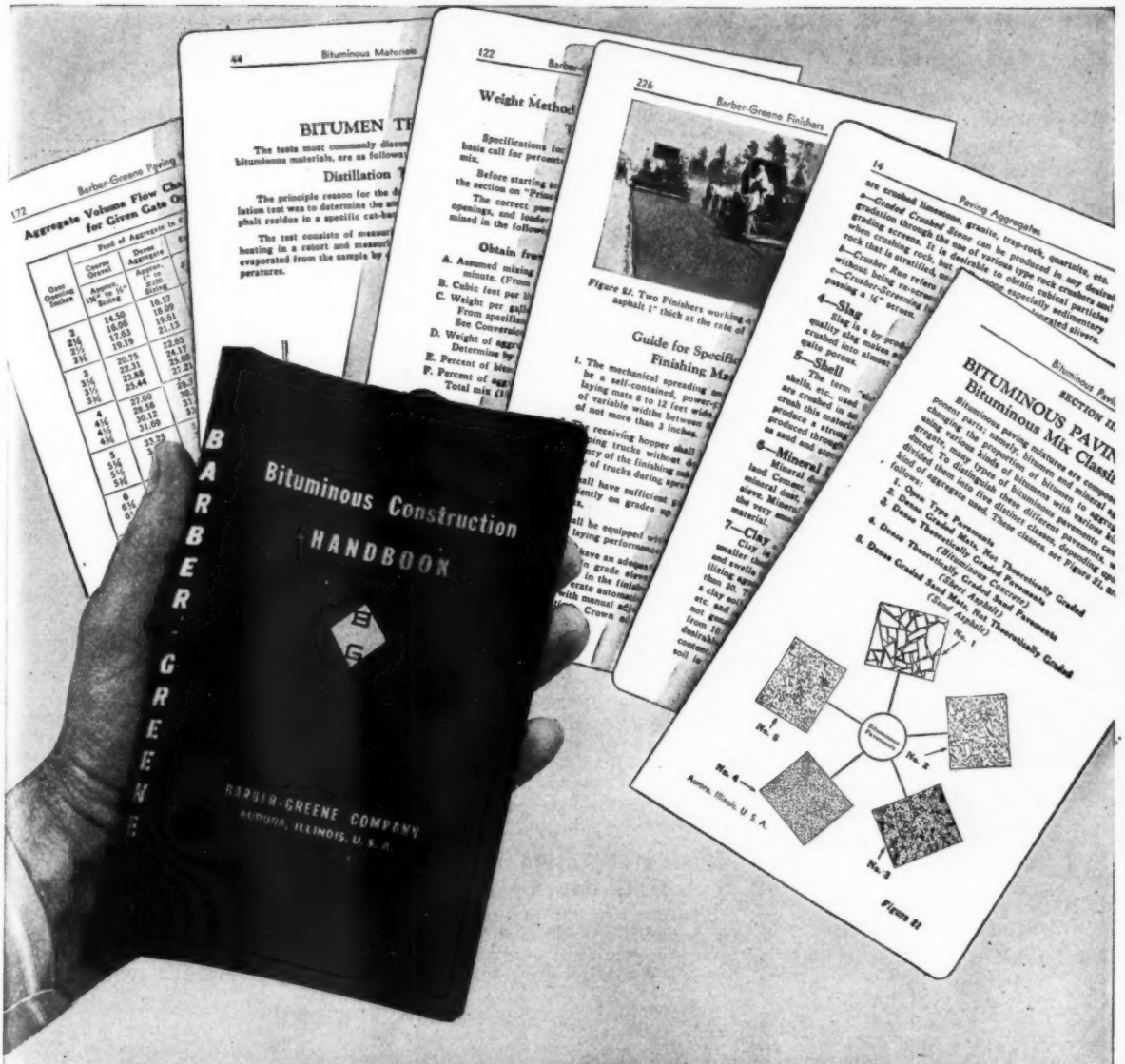
Manufacturer: Harnischfeger Corporation, Milwaukee, Wisconsin.

Claims: Engineered and built for industrial service this machine is being made in seven heavy duty and four intermittent duty models with a range of capacities for handling production welding under continuous operation. Setting and control of current throughout complete service range involves one simple adjustment. The models are marked by a number of other mechanical and electrical refinements which have increased operating efficiency up to 95%.

Fabricated pipe

Manufacturer: The Ruberoid Company, 500 Fifth Avenue, New York, New York.

Claims: This new product called "Eternit" A/C pressure pipe has as some advantages: easier and more economical installation, smooth walls which reduce friction to assure high carrying capacity and the elimination of electrolysis and tuberculation. This pipe is for use in waterworks, drainage, and irrigation systems and many other branches of industry such as chemical plants and pulp and paper mills. Manufactured by a patented extrusion process providing density and strength, it also insures uniform measurements and extremely smooth surfaces both inside and out without machinery. The pipe can be cut in the field with a hack saw and coupled immediately without machine preparation. The pipe is not subject to rust as it is made from the controlled mixture of asbestos fibre and Portland cement. It is manufactured in standard lengths of 13 feet and in diameters up to and including 6 inches.



Now Available

● For many years, Barber-Greene has published data on bituminous construction for its own engineers and servicemen. As this material was seen by others in the industry, many requests were received for such data. The compilation of this data into the B-G Bituminous Construction Handbook is the result.

The Handbook has been completely revised with this issue, greatly amplifying the general engineering data. It is not a picture book or catalog. It is a compilation of material our organization has gathered through close contact with construction operations in this country and abroad.

The Handbook is now available (without charge) to contractors and engineers. Because of paper and material shortages, we hope only those having a definite need or interest in this field will request these Handbooks. Address your request to: Bituminous Equipment Sales, Barber-Greene Company, Aurora, Ill., U. S. A. 43-1

BARBER-GREENE

Shots from the FIRING LINE

Alaskan Highway Is Given New Name

The official name of the highway recently constructed to Alaska has been designated as the "Alaska Military Highway." In announcing the change of name from the old title of "Alcan" highway, Mr. Anthony J. Dimond, delegate from Alaska, stated that all parties concerned have approved the new designation and the Alaskans felt the former name was not appropriate.

Panama Gets on Right Side of Road

In anticipation of opening of the Inter-American Highway, Panama is switching from left to right-hand motor vehicle driving and street lights and signs are being changed to conform with North American practices.

WPB Appointment

Appointment of M. B. Garber as Director of the Construction Machinery Division was announced today by Donald D. Davis, Operations Vice Chairman.

Mr. Garber came to the War Production Board in May, 1942, and has been Acting Director of the Construction Machinery Division since April 3, 1943. Previous to joining WPB, he was export and assistant sales manager of The Thew Shovel Company of Lorraine, Ohio. Mr. Garber resides in Elyria, Ohio.

North Dakota Provides for Engineers' Registration

An act providing for the registration of professional engineers was passed by the 1943 North Dakota legislature and approved by the Governor. It went into effect on July 1. North Dakota is the 46th state to require registration of engineers.

The preparation, introduction and passage of the act resulted largely from efforts of the North Dakota Society of Professional Engineers, which was organized in 1940.

The North Dakota act conforms quite closely to the model law which has been approved by nearly all of the national and regional engineering societies.

Governor John Moses appointed Jay Wesley Bliss, City Manager, Minot; Alexander Carothers Burr, Consulting Engineer, Jamestown; and Clifford Johnson, Bridge Engineer, State Highway Department, Bismarck, to the three-member State Board of Registration for Professional Engineers.

Road Progress in Southern Rhodesia

In less than two decades Southern Rhodesia has experienced unusual highway progress. Eighteen years ago there was not a single highway bridge or culvert in the country while today there are 13 high-level bridges, 366 low-level bridges and 5,742 culverts. Some 3,000 miles of road have been realigned, 2,500 miles gravelled and drained, and 2,123 miles laid with tarmac strips.

Review of Action Taken at A. G. C. Board Meeting

Planning how the general contracting industry can continue to make its maximum contribution to the war effort and how to develop future markets through private enterprise was the principal business of the meeting of the Governing and Advisory Boards of The Associated General Contractors of America in Chicago June 28 and 29.

In summarizing the meeting, President Oscar B. Coblentz, of Baltimore Maryland, said:

"One of the outstanding developments was a growing realization of the necessity in planning future construction markets for each general contractor to exercise his own ingenuity for the development of needed public and private construction. It was a healthy sign that there was the increasing realization that the building of a greater nation in the future is dependent upon actions of local units of government and upon private enterprise."

In reporting to the Boards, Managing Director H. E. Foreman, of Washington, D. C., said:

"The industry in three years has constructed substantially all the facilities needed in this country for training and equipping the armed services to defeat the enemy. This record of construction is unequalled in the history of the world."

A sound foundation for developing a program of action on planning future construction markets was laid by four speakers at the meetings the first day.

Paul G. Hoffman, President, The Studebaker Corporation, and Chairman, The Committee for Economic Development, stressed the need for private enterprise to develop a high level of employment immediately after the war.

Major General Philip B. Fleming, Administrator, Federal Works Agency, Washington, D. C., stressed the need for the preparation of plans and speci-

• Universal 880 Senior plant with a 1036 roller bearing crusher, 30" x 18" roller bearing rolls, 4' x 8' two and one-half deck simplicity gyrating screen, Rotovator, swivel drive feed conveyor with shovel loading hopper and portable lattice frame delivery conveyor operated by Herbert Sargent of Stillwater, Maine, working on construction of federal airports.

SLUGGISH EQUIPMENT

SHACKLES YOUR TRACTORS!

BUCKEYE cable controlled dozers work *with* your tractors, not against them. The moldboards roll the dirt for bigger payloads. Action is fast and snappy with split-second, fraction-of-an-inch control. Extra high lift and unlimited digging depth provide flexibility to handle any job. Engineered balance keeps the full length of crawlers on the ground for maximum traction. These are features to remember in comparing tractor equipment.

ENLIST WITH THE "SEABEES"

BUCKEYE TRACTION DITCHER CO.

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Built by Buckeye

Convertible Shovels

Trenchers

Tractor Equipment

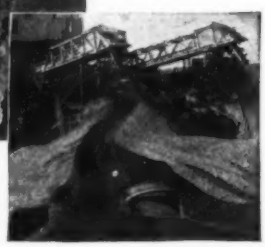
R-B Finegraders

Road Wideners

Spreaders

SAUERMAN
Power Scapers

Dig and haul any material for few cents per yard.



Operated by one man.

The savings in man-hours that are being made on hundreds of excavating and mining jobs by using Sauerman Power Scrapers run into large figures.

Thus this simple, sturdy equipment contributes to the war effort while adding to its 30-year record for conserving labor and power in moving all kinds of earth materials.

Write for Catalog

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574 S. Clinton St. Chicago 7, Ill.

fications and the securing of sites by governmental units for post war construction.

G. Donald Kennedy, Vice President, Automotive Safety Foundation, and Chairman, Post War Construction Committee, American Society of Civil Engineers, stressed the necessity for local units of government to prepare the blueprints and secure the land for needed public works improvements to start immediately after the war.

Edward P. Palmer, President, Senior & Palmer, Inc., New York City; past president of the A. G. C.; and Chairman, Construction and Civic Development Department, United States Chamber of Commerce, emphasized that the two fundamental prerequisites for the development of particularly the durable goods industries after the war are: funds in the hands of corporate and private investors, and a confidence that the country will pursue sound economic policies. Because the useful life of a construction project is longer on the average than that of other durable goods, construction is more dependent than any other industry upon a firm and lasting confidence in the future of the nation.

The boards adopted the report of the Market Development Committee, of which Fred I. Rowe, of the W. L. Johnson Construction Co., Hicksville, Ohio, is chairman. This established principles, objectives and methods to be followed by A. G. C. members in planning future construction markets.

As principles the committee recommended that the A. G. C. "urge the promotion of construction of needed private and public projects which can be justified on the basis of the need from the standpoint of utility and their general cultural value; recommend to its client the use of the contract system with its skill, responsibility and integrity to secure the most to the owner for his money as well as to provide new business opportunities in the general economic fabric of both domestic and foreign fields of business; recommend that plans and specifications be prepared by qualified, competent and experienced architects and engineers; and the A. G. C. will freely exchange techniques of construction procedure to the end that the private client and the public owner shall receive the most construction for the least money."

Objectives for the A. G. C. outlined in the report were to "point out field of activity under which contractors' organizations can function during the war period and following military victory; to encourage the preparation of plans, specifications, the acquisition of right-of-way, and methods of financing construction; and to keep before private and public owners the advantages of having their construction work performed by contractors under accepted forms of contract."

A report by a special planning committee of the A. G. C. Secretaries Council, headed by Roy A. MacGregor, Manager, Constructors' Association of Western Pennsylvania, also was adopted. The report outlined activities for chapter secretaries to follow.

Following a discussion of government contract awarding procedures at the present time, a motion was adopted that the A. G. C. recommend to all government agencies that they return as soon as possible to the method of awarding construction contracts to the lowest responsible bidder after public openings of advertised bids.

The Labor Relations Committee reported that the complexity and confusion permeating the construction labor situation can be traced to the slowness in development of a national war time labor policy.

Brigadier General C. L. Sturdevant, Assistant Chief of Engineers, reported that the volume of army construction at home this year will reach but 30 per cent of last year's total of more than five billion dollars.

He told of the need for 100,000 experienced construction men in the Corps of Engineers, and outlined the plan which has been worked out whereby men can through voluntary induction become specialists in the Corps.

William E. Hayes, of Washington, D. C., outlined provisions of present and future war tax bills of particular interest to contractors. He concluded: "Whether or not the $53,000,000,000 of income now exempt and excluded from income tax is to meet its fair share of taxation before higher or retroactive rates of taxation are imposed on pres-

Since 1916

THE MORE IT CARRIES THE MORE IT CAN PULL

LINN

CONTOUR-FOLLOWING TRACTION

All over the world today LINN transports **heavy loads** for the Allied Nations. They are borne by LINN Traktrailers—hauled by the LINN Haftrak.

THE LINN MANUFACTURING CORPORATION
MORRIS NEW YORK

This Pennsylvania Shale broke poorly when blasted, giving small shovel and trucks a great deal of trouble. LeTourneau Rooter and "Caterpillar" D8 tractor ripped it up fine enough so the cut could be excavated and brought to grade by tractor-scraper outfits.

A Rooter Will Help You Move More Yardage Faster With Fewer Men and Machines and at Lower Costs

You can increase the efficiency of your Tournapull and tractor-operated Carryall Scrapers by first breaking up all hard materials—shale, hardpan, sun-baked clay or frozen ground—with a LeTourneau Rooter. By using a Rooter you get bigger Scraper loads in less time, and cut down maintenance on your tractors and tractor tools.

On most earthmoving jobs in tough, rocky material, rooting also eliminates the need for shovels, compressors and drills and gives better fragmentation for Scraper loading than does blasting. It's safer . . . faster . . . far cheaper . . . and requires fewer men. Thus, you save on both manpower and tools.

Built to Work On Your Dozer Tractor

Both LeTourneau Rooter and Dozer are single-cable operated . . . can be combined on standard rear-mounted 2-drum Power Control Unit . . . to root and doze over short hauls with one tractor, or for pusher loading rooted materials into Carryall Scrapers. Your tractor operator easily handles both tools . . . neither interferes with the operation of the other.

Quickly Interchangeable

Rooter is easily dropped to free tractor for LeTourneau Carryall Scraper, Crane and other drawbar work . . . thus, further increases the usefulness of your tractor.

2,000 In Use

With more than 2,000 rugged LeTourneau Rooters now in use by successful contractors, miners, pit and quarry operators and loggers all over the world . . . these job-proved methods are sure to give you lower cost earthmoving . . . same time, will help you lick the man and machine shortage problem.

Put these profit-making, work-increasing Rooter methods into operation NOW. And for parts and repair service . . . call your LeTourneau-"Caterpillar" dealer. He is equipped to keep your tractors and LeTourneau earthmoving equipment working at full efficiency for Victory.

Ground Frozen 16 to 20-inches deep

is here broken up for Scraper handling in midwinter by a LeTourneau Rooter pulled by two "Caterpillar" D8 tractors. LeTourneau Rooters are stoutly welded to stand up to tough going like this.

Manufacturers of DOZERS, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNAROPE*, TOURNATRAILERS*, TOURNAWELD*, TRACTOR CRANES.

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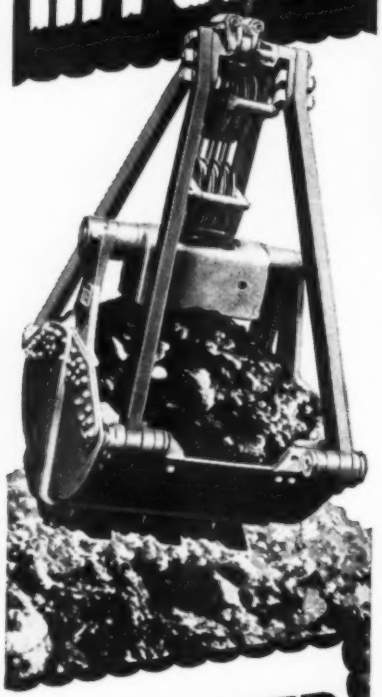
HI-POWER



FOR BIGGER PAYLOAD DIGGING

Engineered all the way through to do the job. Backed by fifty years of specialized manufacturing skill and experience. The pay-off bucket for better, more efficient 1943 work.

Haiss Hi-Power has the brute strength for heavy digging, and the power in its bite to yank loose an embedded boulder. Weight and closing power combine to dig deep and tear out a heaping bowlful at every grab. Alloy steel parts for abrasion resistance, long bearings for longer wear.

★ *Bucket agencies throughout the country. Write, wire for prices, delivery and catalogs.*

GEORGE HAISS MANUFACTURING CO., INC.

144th St. & Park Ave. New York 51

• **Resting on the two Bucyrus-Erie 15-B, ½-yard shovels that they use to teach operation and maintenance to enlisted men at Fort Belvoir, Va., are seven of the ten instructors who train 25 men each two weeks. These instructors are, left to right: T/4 J. Bussema of Riverside, Ill.; T/5 H. H. Wagner of Ritzville, Wash.; T/Sgt. T. S. Womack of Springfield, La.; Pfc. C. Bingen of Phelps, Wis.; T/3 A. LaBree of Hartford, Conn.; T/5 V. C. Genteman of Portland, Ore.; and T/Sgt. H. L. Moore of Venice, Fla. The other three instructors, not shown in the picture, are T/3 E. P. Clark of Denver, Colo.; T/5 T. J. Bennet of Cadox, Ohio, and Pfc. E. A. Roak of Sandborn, Ind. Captain Arthur H. Barclay, C. E., is head of the department of Mechanical and Technical Instruction of the Engineer School at Fort Belvoir.**

ent day individual and corporate income rests to a large extent on the knowledge of the situation and the activity of present day income tax payers."

Train Enlisted Men in Shovel Operation

Ten instructors, several of whom had civilian training and experience, are training men to operate, maintain and lubricate power shovels and their attachments at the Enlisted Men's School Shovel Course at Fort Belvoir, Va. The men are in the school for a limited time only, and although they are not polished operators when they graduate, they do know the correct way to operate and maintain shovels. With some actual operating experience they develop into first class operators.

About 25 men are trained as shovel operators every two weeks. During their course at Fort Belvoir, the men study two makes of ½-yard shovels, one make of ¾-yard shovel and a truck mounted ⅜-yard shovel. The attachments studied include shovel, dragline, clamshell, and pile driver. Maintenance work includes lubrication, adjustments of all clutches, brakes, cables, and drive chains, and the care and maintenance of wire rope.

OBITUARIES

SAMUEL REID RUSSELL

Samuel Reid Russell, 63, of the Explosives Department, E. I. du Pont de Nemours & Company, died suddenly early Thursday morning, July 8, at a hotel in Easton, Pa., where he had gone to supervise a blast. He lived in Wilmington, Delaware.

The foremost authority on all kinds of quarry and marine blasting, he perfected the method of tunnel blasting in open quarries. He supervised shots not only in this country, but in Canada and South America. He often was called in as a consultant to the government on various projects, the deepening of Honolulu harbor being one of many, and one of particular interest.

Mr. Russell was the country's outstanding technician on precision dynamiting. One of his most spectacular accomplishments was the felling of a river dam which had been built upright on one bank. By accurate blasting of a retaining wall, he dropped the preconstructed dam in a prepared base with only inches to spare on either side of the dam.

Whenever there was a big, dangerous blast to be made, "Sam" Russell was called upon. He felled many an obsolete factory chimney within a narrow space between two buildings. He dynamited old bridges and made the debris fall exactly in a previously selected spot. During his lifetime he blasted loose literally billions of tons of rock. Recently he was called in as a consultant on another type of shot in Canada, which will involve the use of 2,300,000 pounds of high explosives in one charge. Once he even blasted a

Clipper pilots have extra eyes

To assist in making night-time landings at the far-flung marine and land bases of Pan American World Airways, every Clipper captain has several "extra eyes"... radio, navigation, wing lights — and a piercing, dependable beacon light.

The big Diesel generators that pump power to these street lamps of the sky are the Clipper stations' nerve centers. They supply electricity for work shops, kitchens and living quarters — as well as illumination. They must be kept going at top efficiency night and day. To make sure they do, Pan American lubricates its Diesels with RPM DELO.

RPM DELO frequently doubles the time between Diesel overhauls. It ends ring-sticking, protects bearings against corrosion, cuts ring and liner wear to the thinnest minimum. No other lubricating oil gives your Diesels the protection they get from RPM DELO — because no other compounded oil combines its ring-cleaning, non-corrosive and anti-oxidant properties.

ORDER RPM DELO FOR YOUR DIESELS

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Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity

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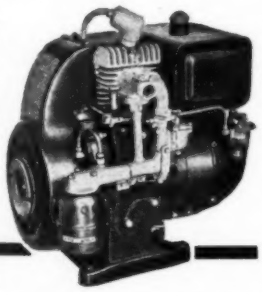
ONAN
ELECTRIC PLANTS
Electricity for Any Job—Anywhere
ONAN GASOLINE DRIVEN ELECTRIC PLANTS provide electricity for Contracting and Engineering projects in locations where power is not available, and for Emergency and Standby Service.
Thousands of these reliable, sturdy plants are doing a winning job on all the fighting fronts by providing electricity for many war tasks.
Ratings from 350 to 35,000 watts. A. C. 50 to 800 cycles, 110 to 660 volts. D. C. 6 to 4000 volts; or dual A. C. and D. C. output. Air or water cooled.
Details gladly furnished on your present or post-war need for Electric Plants.

D. W. ONAN & SONS
1853 ROYALSTON AVE., MINNEAPOLIS, MINN.

foundation in the middle of a power plant without the plant's dynamos shutting down for a minute.

He helped develop new methods for harbor blasting, particularly for cleaning out big harbors such as that of New York City. He was consultant to many of the country's largest engineering and contracting firms on their biggest projects. As the leading dynamite expert, he addressed engineering societies, clubs and other organizations all over America. He also wrote numerous articles for trade publications on the techniques of dynamite blasting.

Mr. Russell was born in Belfast, Ireland. He came to this country at an early age, and was educated at Troy, N. Y., high school, and Rensselaer Polytechnic Institute.

He worked as a construction engineer for several companies before he joined Du Pont in 1907 as a salesman in the Nashville, Tenn., office. He soon was transferred to the technical division, and became one of the country's first specialists in dynamiting techniques. He was senior technician at the time of his death.

Mr. Russell is survived by his wife, Adelaide C. Russell; two daughters, Mrs. Raymond Atkins and Miss Adelaide Russell and one son, Lt. Samuel R. Russell, Jr., of the United States Army.

CHARLES EDWARD STUART

Charles Edward Stuart, 61, president of the engineering firm of Stuart, James & Cooke, Inc., who achieved international fame for his work in reorganizing the Soviet Russian coal mining industry under that nation's original Five-Year Plan, died June 20 in a New York City hospital after a short illness.

A resident of Douglaston, L. I., but recently in Washington on a confidential mission, Mr. Stuart went to Russia in 1926 as a consulting engineer to aid in reorganizing the coal mines along efficient American lines in the Donets Basin.

Mr. Stuart was born in Alexandria, Virginia. After his graduation from Virginia Military Institute, he became associated with Westinghouse Electric and Manufacturing Co.

In 1911 he organized and became senior partner of the firm of Stuart, James & Cooke, which now has offices in New York and Washington. During the First World War he was chief of the power conservation section of the Fuel Administration, and directed the national campaign for power conservation. He also served on the coal production committee of the Fuel Administration and was an associate member of the power committee of the War Industries Board.

From 1934 to 1936 he served as executive vice president of Export-Import Bank, resigning in the latter year. In the summer of 1936 he was named by President Roosevelt as a member of a special commission to conduct a three-month study of cooperatives in ten European countries.

He was a director of the American-Russian Chamber of Commerce; a governing member of the National Foreign Trade Council, and a member of the American Institute of Electrical Engineers and the American Institute of Mining and Metallurgical Engineers. He was widely known in England, France and Germany, as well as in Russia and the United States.

Surviving are his wife, Mrs. Dorothy Sanders Stuart; three daughters, Mrs. Daniel M. Dent of Plainfield, N. J.; Mrs. Julian T. Burke, Jr., of Alexandria, and Miss Patricia Stuart of Washington, and a sister, Mrs. R. Yeaton Stuart.

CAPT. ARTHUR W. BRANDT

Captain Arthur W. Brandt, 55, recently retired New York State Commissioner of Public Works, died of heart attack June 11 in Washington, D. C., where he had gone on business connected with his interest in a post-war program of public works, particularly highways. Before becoming public works commissioner, Captain Brandt served as New York State Highway Commissioner from 1924 to 1929.

Born in Wayne County, N. Y., Captain Brandt was graduated from Tufts College School of Engineering in 1912.

The OWEN BUCKET Co.
6095 Breakwater Avenue, Cleveland, Ohio
Branches: New York Philadelphia Chicago Berkeley, California

PLAN AHEAD

FOR "CATERPILLAR" DEALER SERVICE

THESE WAR DAYS, all of us have to plan our time, just as we figure ahead so we won't be caught without gasoline—or butter—or shoes. It's even more important to anticipate the needs of your "Caterpillar" Diesel equipment.

Your "Caterpillar" dealer has a big job on his hands, keeping all the heavy equipment in his territory in good running order. On the other hand, it's vital to you that your machine lose as few working hours as possible.

A little forethought now may save you a lot of time and expense. Take a look at your calendar. Figure when you will best be able to spare your "Caterpillar" Diesel. Then get in touch with your "Caterpillar" dealer and arrange a date beforehand. A quick inspection will enable him to tell whether a complete overhaul is needed—whether any parts must be replaced—or whether minor adjustments will answer the purpose. If parts are necessary and orders are placed well in advance, he'll be ready to give you prompt service on the day you've set.

Sturdy stamina is built into every "Caterpillar" Diesel. But even such a machine needs service when it's worked overtime month after month. Make advance provision for that service—don't put it off until the eleventh hour. Being forehanded in such matters helps to spread the available materials and man-hours fairly among all owners. It's one way to win the war.

Your "Caterpillar" dealer will do his best for your equipment. And his "best" is mighty good. Modern shop practices and precision tools enable him to make service adjustments and repairs with the least expenditure of money and war-needed metals. If you need a new "Caterpillar" Diesel for war-essential work, he will gladly advise you on how to apply for it. And if you can't obtain a new machine, he will do his utmost to keep your old equipment running.

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

TO WIN THE WAR: WORK—FIGHT—BUY U. S. WAR BONDS!

You Can DRILL MORE HOLE With Bits

From your experience in drilling blast holes, you know you can get more hole with bits having longer body sections and deep, wide water courses.

Bucyrus-Erie bits have these and other features. They are cropped down to the toughest, strongest steel in the ingot, and forged to shape, thus refining the grain of the high quality bit steel used. They are easier to sharpen, and because of their long body sections will take more sharpenings and give longer service.

Try them on your job. You'll find that you can put down more hole, faster, with Bucyrus-Erie bits.

M11

Bucyrus·Erie

SOUTH MILWAUKEE, WISCONSIN

He immediately entered state service as an engineer in the State Canal and Highway System. During the First World War he served in France with the 1st Combat Regiment of Engineers of the 1st Division.

Surviving are his wife, Mrs. Adelaide Hawes Brandt of Macedon, N. Y., and a daughter, Mary Linda Brandt.

FREDERICK M. GAHAGAN

Frederick Mussen Gahagan, 44, prominent construction and hydraulic dredging engineer, died July 7 of leukemia in the Lenox Hill Hospital, New York. He recently returned from Panama, where, for the large part of the last two years, he had been overseeing projects for the Gahagan Construction Corp., of Brooklyn, which he headed.

Born in Brooklyn, Mr. Gahagan attended Williams College and Columbia University, graduating from the latter in 1923. He then joined the construction firm headed by his father, the late Walter H. Gahagan, as assistant engineer.

Since his election to the presidency of the Gahagan Construction Corp. and its affiliates in 1933, he had supervised the direction of contract operations with federal, state and municipal governments, railroads and private interests exceeding $30,000,000 in cost.

Last year the corporation purchased and assembled at its Albany, N. Y., shipyard the Bucyrus-Erie 30-inch hydraulic dredge Nebraska, the largest operating on the Atlantic coast. It is currently being used in the construction of the new Idlewild Airport on Jamaica Bay.

Mr. Gahagan was first vice-president of the General Contractors' Association and a director of the National Association of River and Harbor Contractors. He also belonged to the Navy League, the Pan-American Society, the Lotos Club, the Downtown Athletic Club and the Yale Club.

Surviving are his wife, Mrs. Alice Gerli Gahagan; two sons, Frederick G. and William G. Gahagan; two daughters, the Misses Alice Louise and Gerli Gahagan; his mother; two sisters, Mrs. Helen G. Douglas and Mrs. Lillian G. Walker, and two brothers, William C. and Capt. Walter H. Gahagan.

Amend Construction and Equipment Machinery Order

Limitation Order L-192, originally in November, 1942, was designed to integrate the production and distribution of construction machinery with the nation's over-all war production. The order has since been amended several times, the current issue bearing the date July 2, 1943.

Controls under L-192 are effected by (a) scheduling the production of all manufacturers and (b) by segregating the various items of equipment into several categories, and placing specific controls on each separate category as the degree that need and importance of the end-use of the items warrant. The controls enable the War Production Board to examine monthly the planned production and delivery schedules of all construction machinery manufacturers and, on the basis of the information submitted, to approve, modify, or deny the schedules. In writing the repair parts provisions of L-192, considerable thought was given to the maintenance problem.

In addition to insuring that no one obtain excess repair parts, the Division provides a means of getting prompt assistance for immediate repair of working equipment, a separate means for rebuilding and reconditioning idle equipment, and for the acquisition of a repair parts inventory. It further provides that a producer may not deliver in any month more than 75 per cent of his combined production and inventory of any repair part to War Agencies, if doing so prevents delivery of that specific repair part in that month to any other person. In this way the Division sees to it that each month there is being reserved for non-war agencies or civilian users an amount up to 25 per cent of the combined production and inventory of every repair part produced. The provision, however, only operates when war agency orders exceed 75 per cent of the producer's output. If the delivery of a

"TAXIES"
for Hell Buggies
ARMY E NAVY
Tanks move doggedly forward wreaking havoc on the enemy but their speed is necessarily slower than trucks and their span of continuous service considerably more limited.
So they crawl up on Rogers Trailers and are moved quickly to the line of combat—or from it when repairs or reconditioning becomes necessary.
Thus, the effectiveness of an important combat unit is increased manifoldly by these non-combat vehicles.
ROGERS
LOW BED-
-HEAVY DUTY
TRAILERS
ROGERS BROTHERS CORP.. ALBION, PENNA.

These two kinds of wire rope are made in our factory of the same special analysis high carbon steel, the same carefully controlled heat treatment and continuous wire drawing process. As made by our skilled craftsmen both give you plus value.

Yet there is a difference which means money-in-your-pocket. It is this: In ordinary wire rope of any make, the wires are "laid" into position without first being relieved of stresses set up through changing wires from straight to helical or spiraling shapes. Under these unresolved stresses, the wires have a strong tendency to fight each other and will fly apart when the seizing wire is removed. This wasted effort cuts down the resistance to bending fatigue of the rope as a whole.

In *Union-formed* wire rope, the method of helical or spiral shaping the wires in it before they become component parts, entirely frees the rope of shaping stresses. Thus preformed, parts lay in their positions in such perfect repose that they will not fly apart—in fact, often must be pried from position. *Union-formed* wire rope, therefore, utilizes its full stamina for maximum resistance to bending fatigue. That is why *Union-formed* wire rope bends more easily. Every wire and every strand pulls together to wear longer.

This is only one of 10 time-saving, money-in-your-pocket advantages of *Union-formed* wire rope. To the limit permitted under conditions of war, Union is striving to satisfy urgent needs outside of war production.

UNION WIRE ROPE CORPORATION
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Tulsa • Houston • Chicago • Salt Lake City • New Orleans
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IF YOU ARE NOT ON OUR MAILING LIST send for these bulletins: "ROPE DOPE," "Socketing Wire Rope," "Splicing Wire Rope," "Correct Handling of Wire Rope," and "Wire Rope Lubrication." Engineering information supplied without obligation. G-43

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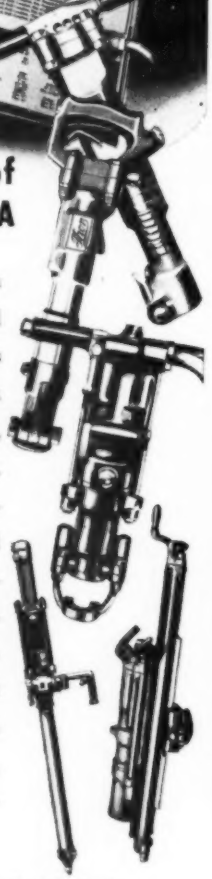
"THE ULTIMATE IN LOW COST WIRE ROPE"

THREE TIMES WON
FOR EXCELLENCE IN
WAR PRODUCTION

WHEN YOU NEED PREFORMED WIRE ROPE
SPECIFY **union-formed**

NEW HELP

IN SELECTING THE RIGHT AIR TOOLS



Latest, Revised Edition of Thor Air Tool Catalog 42A

Just off the press is this latest edition or Thor Catalog No. 42A, packed with information on Thor air tools to speed your wartime work—rock drills, paving breakers, clay diggers, sump pumps, and associated tools. Here, in easy-to-find style, are complete specifications, descriptions and photographs of all tools . . . on-the-job action pictures . . . and engineering drawings of exclusive Thor construction features that help you get more work done in less time with less manpower. Send for this handy, helpful reference manual now—mail the coupon today!

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quantity greater than 75 per cent in any month to War Agencies would not prevent a producer filling all orders from civilian users a producer may con tinue to deliver until by doing so he interferes with civilian orders. It should be kept in mind, however, that under the terms of L-192, dealers' or distributors' repair parts orders to replace inventory or to fill orders not yet sold by a dealer or distributor are not considered in arriving at the 75 per cent —25 per cent division.

Authorize Construction of Scofield Project

President Roosevelt has authorized the Bureau of Reclamation to construct the Scofield project in Carbon county, Utah, for irrigation and flood control purposes, Secretary of the Interior Harold L. Ickes announced.

The approval permits the Bureau to replace the existing Scofield dam, built by private interests in 1925-26, to avert a total failure of the badly-deteriorated structure during a sudden flood, Mr. Ickes said. Vital parts of the old dam have collapsed and it is a constant threat to the safety of farms, industries and lives below it.

The new Scofield dam will be an earth-fill structure, 56 feet above the stream channel, 420 feet long, with a crest width of 30 feet, and will be constructed just below the existing unsafe dam. In addition to Bureau forces, alien, Civilian Public Service, or similar labor may be used if available, or the dam may be constructed by contract. The total estimated construction cost of the project is $640,000.

Describe Structural Features of Detonators

In the interest of safer and a more efficient use of commercial blasting materials, the Bureau of Mines has issued a new publication describing the structural features of detoonators used by the mineral industries, Dr. R. R. Sayers, Director of the Bureau of Mines, reporoted to Secretary of the Interior arold L. Ickes. Coal and metal mines

HAYWARD BUCKETS

WON'T QUIT OR CAUSE TIME OUT

A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

THE HAYWARD COMPANY
52-54 Church Street
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A Time-Saving **ACCESSORY**

RED ARCH CHAIN

Red Arch incandescent butt-welded dragline chain has twice the strength and wearability of ordinary chain. It will save you extra money because of less shutdown time. You can get any size chain from ⅝" to 2" to fit your bucket.

T34B

BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

and quarries are the heaviest users of industrial explosives and last year their purchases of permissible explosives, black blasting powder, and high explosives totaled about 385,000,000 pounds.

The publication, written by R. L. Grant, assistant chemical engineer in the Bureau's Fuels and Explosives Service, also reviews the improvements and uses of typical fuse and electric detonators introduced in recent years.

A copy of the publication, Report of Investigations 3696, "Structural Features of Typical American Commercial Detonators," by R. L. Grant may be obtained from the Bureau of Mines, Department of the Interior, Washington, D. C.

Change Procedure For Equipment Disposal

Complete overhauling of the army's procedures for disposing of surplus government-owned and army-controlled industrial property to the end that such property may find its way back into the war production program with the utmost speed, or into civilian channels if the war program does not require it, was announced by the War Department.

The new procedure eliminates many present requirements that entailed delays in the disposal of such surpluses, and permit their sale to private jobbers, wholesalers or dealers when there is no immediate known use for them under existing army war production contracts or by other government agencies.

Phosphorus

(*Continued from page 387*)

out at left of man in the picture) and other walking machinery at this point and began lowering the boom. When the boom came to rest on the earth pile the counterweight overbalanced the front end of the machine and the front began to rise. When the base reached a level position, cribbing was placed under the rear of the machine to take part of the weight. (Cribbing is shown in pictures Nos. 2 and 3.)

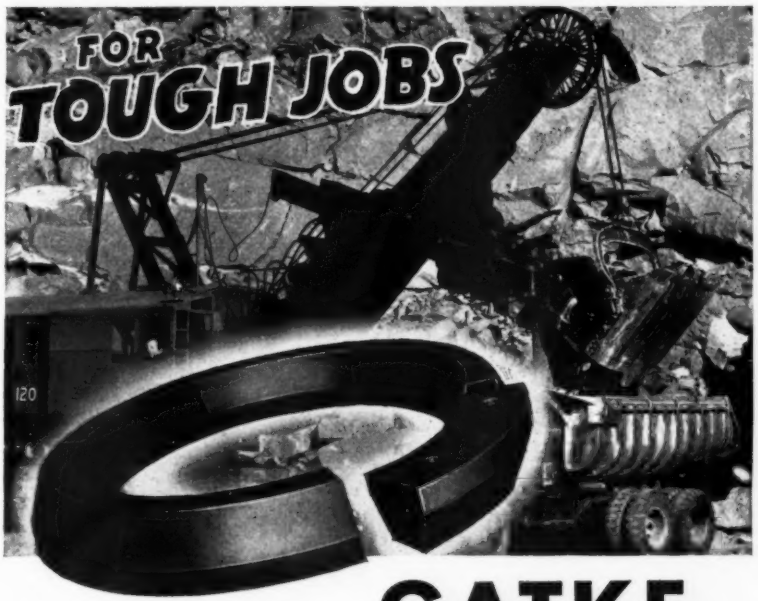
5. Pulled timbers from under machine using a tractor with chain and cant hooks with the wooden handle removed. (This is shown in pictures Nos. 4 and 6.)

6. Set four jacks under base equally spaced around the circular tub. Uncoupled and lowered base the distance required to give clearance for removal of lower center pintle. (One jack shown in picture No. 5.)

7. The remainder of the job is obvious. The new lower center pintle was bolted to base; the base jacked up into place; the 14" x 14" timbers put back in trench; the chock removed from cam and the last half step of the walking cycle completed. This set the machine back on the 14" x 14" timbers, ready to go.

"In our case we removed the electric cable and reconnected through a window to give lights for use at night and to supply power for electric welders and painters," Mr. Webster said.

"It took us exactly an hour to jack the machine to a level position in this manner. Had we not lost three hours in the removal of the center pintle nut the whole job would have taken only 20 hours," he concluded.



Cone Type Swing Friction for Northwest Shovel. Precision moulded in proper sizes for all models.

GATKE
Moulded Frictions

Whether it's loading rock or swinging heavy loads on a long arc, GATKE Moulded Frictions give you plenty extra—

Tremendous power for positive, effortless control with no let down when things get hot;

Smooth, non-grabbing action that gets the job done with reduced strain on men and equipment;

Long wear life that gives steady operation and avoids adjustment delays.

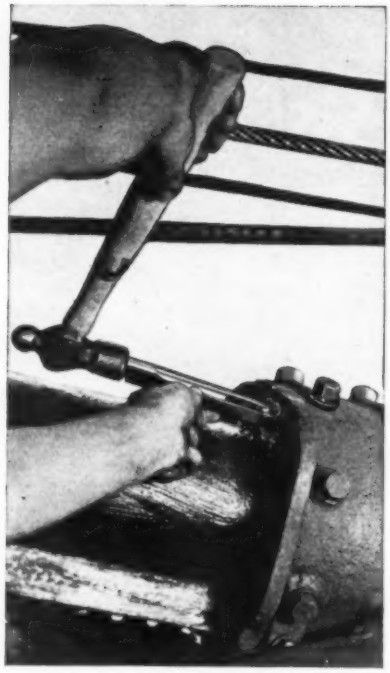
Unless you are using GATKE Frictions *you are missing plenty*—they are *guaranteed to do the job better.* Just tell us what you need or write for literature.

Other
GATKE PRODUCTS

Brake Lining and Clutch Facings for all requirements of Shovels, Drag Lines, Cranes, Hoists, Trucks, Tractors, Trailers, and all kinds of Road Building, Excavating and Construction Equipment.

Non-Metallic Bearings for replacement service. Engineered for the application and moulded to machined accuracy in all shapes and sizes. Send for bulletin.

GATKE CORPORATION
232 N. LaSalle St. Chicago



• Illustrating method of tightening saddle block with shims.

Power Shovel

(*Continued from page 389*)

months or oftener, instead of once a year.

Engine Maintenance

Naturally smooth, trouble-free operation of the unit's power plant is essential; and, here again, the need for continual watchfulness must be emphasized. Your shovel's engine, unlike that of your automobile or even of your truck, is subjected to constant rack and stress which frequently throw accessories out of adjustment and lead to serious trouble.

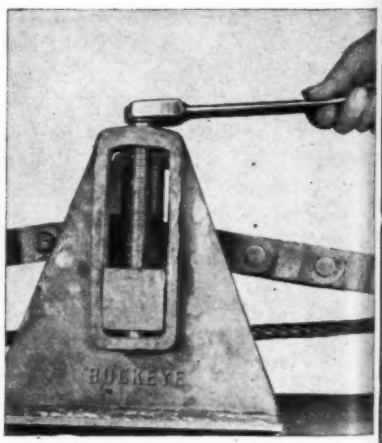
Here are "Ten Commandments" of engine operation as given by The Buda Company which will give you days free from engine trouble:

1. Know your engine thoroughly! Read the manual of instruction furnished by the manufacturer and do the things advised in it.
2. Keep the engine and its accessories clean. Dirt often hides trouble in the making. Look for loose connections or bolts as you clean.
3. Keep the radiator filled with clean water. Never add water to an overheated engine.
4. Use only the oil of recommended specifications.
5. In starting, use the choke no more than necessary, as too much use of the choke allows gasoline to dilute the oil.
6. Warm up the engine slowly when the weather is cold. Never race a cold engine.
7. Do not force the engine — avoid over-load. When not using the engine — idle it; stop it if the period is prolonged, unless the weather is sub-zero; then allow the engine to idle.
8. If trouble develops, correct it before it becomes serious. Don't run an engine that is not operating properly.
9. Always keep the air and oil filtering systems clean.
10. Personally inspect the engine and its accessories daily.

Take note when your engine is hard to start — when it misses — when it knocks — when it overheats — when it loses power — when you have a smoky exhaust — when it backfires — when the radiator boils — all these are definite indications that something is wrong, and should be immediately attended to by the operator.

In conclusion, I wish to point out that in shovel operation the strong, steady pull accomplishes the most work with a minimum of wear on the machine. The shovel's mechanism is tuned and adjusted for smooth, unhurried operation — it is foolish to attempt to rush or press its efforts. For the few minutes you might possibly gain, you will pay for dearly in worn or broken parts, and in hours lost while making repairs, replacements and adjustments. Your problem is to make your shovel last as long as possible; and in the interest of conserving vital equipment, try to anticipate the ravages of stress and wear, and forestall them by eternal vigilance backed up by common sense, your grease gun and your repair kit.

• This is the method used to adjust the idler on the boom.



Forged Parts Make Simplex Trench Braces Safer!

Made in 14 sizes, 16" to 60" long (in closed position).

The only Trench and Timber Braces constructed with drop forged balls, sockets and lever nuts. Unbreakable and more durable than malleable braces. The blunt safety lever nut prevents injuries. The ball and socket joints at both ends permit quick adjustment at any angle. They protect pipe laying crews against cave-ins; eliminate re-digging. *Ask your equipment dealer.*

Templeton, Kenly & Company
Chicago, (44) Illinois

Better, Safer Construction Jacks Since 1899

Simplex
LEVER · SCREW · HYDRAULIC
Jacks

Make Your Jacks Last Longer!
Don't overload them—don't try to make one jack do the work of two. Send for bulletin on care of jacks.

Top: Baker Bulldozer-equipped tractor compacting runway with sheepsfoot rollers on a Southwest Pacific Island.

Center: Tree dozing for a landing strip at Guadalcanal with a Baker Bulldozer.

Bottom: A Seabee clearing land for a landing field in the Southwest Pacific with a Baker Bulldozer.

Top and bottom pictures: "Official U. S. Navy Photographs."

SEABEES USE BAKERS TO BEAT JAPS ON SOUTH PACIFIC ISLANDS

Tree Dozing, Leveling and Grading Speeded to Completion

Hogging out landing strips and airports on South Pacific islands, despite almost continuous air and land attack, was speeded to completion with Baker Bulldozers and Gradebuilders. Seabees, U. S. Engineers and other construction units used these versatile tractor units to hasten many construction jobs.

Tree dozing and jungle clearing, road building, leveling and grading landing strips and air fields—all were taken in stride and speedily finished.

Top Brace Is Safety Factor

In jungle dozing, the overhead brace on Bakers was found to be a valuable safety factor as falling palmetto and other trees could not fall on top of the tractor operator. Flexibility of blade lift made tree dozing simple as hydraulic control allowed for inching the blade up the tree trunk for increased leverage pushing after the fall was started.

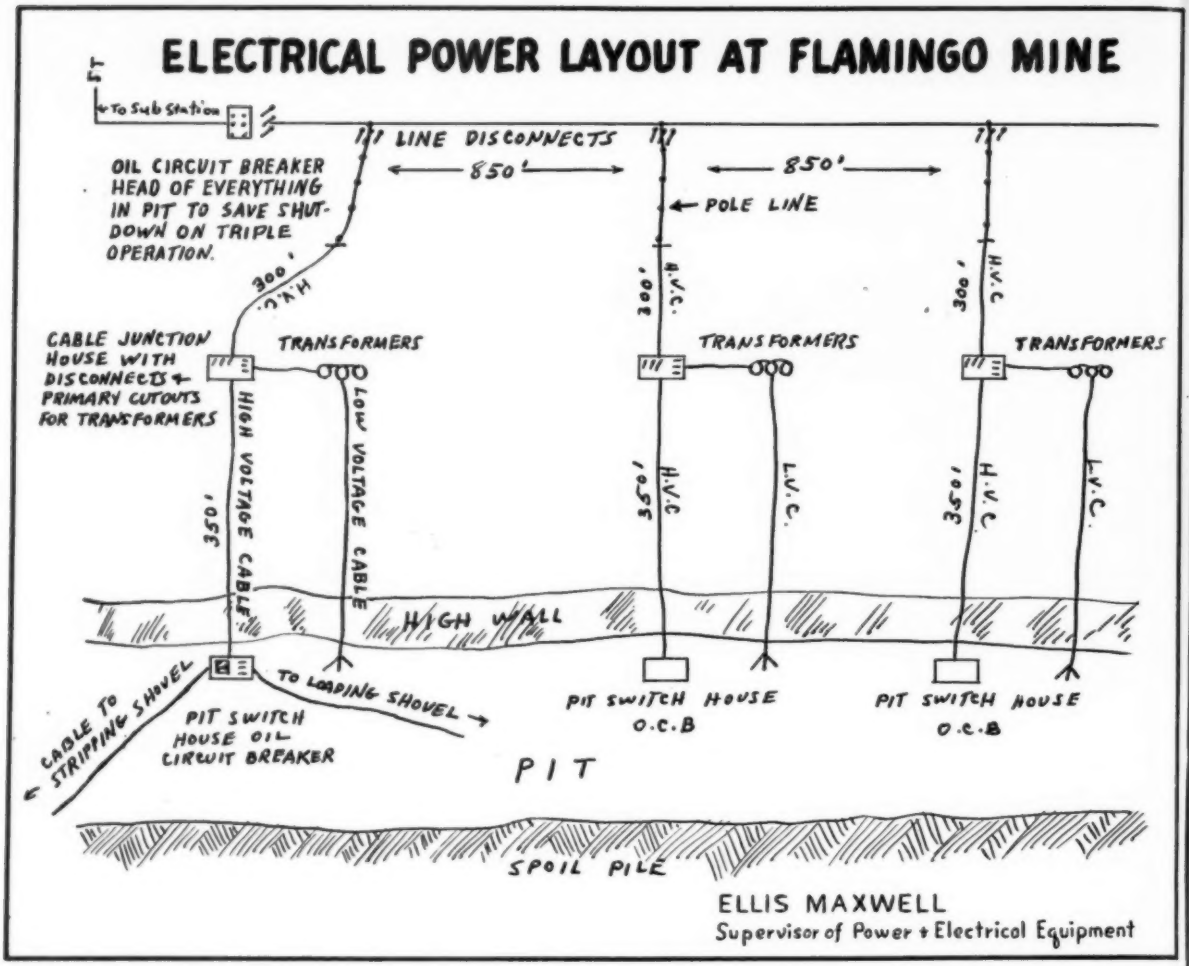
Hydraulically operated blade control, full down-pressure and smooth lift simplified grading and leveling despite the inexperienced operators, adding to speed of operations and quality of construction.

Bulldozer-equipped tractors were also widely used for pulling sheepsfoot rollers and other equipment and for hauling loaded wagons and trailers.

THE BAKER MFG. CO.
504 Stanford Ave.,
Springfield, Illinois

BAKER

The Modern Tractor Equipment Line for
EARTH MOVING
LEVELING AND GRADE BUILDING
SNOW REMOVAL
ROAD MAINTENANCE



Flamingo Mine

(*Continued from page 383*)

central control panel. A system of warning signals, both visual and sound, guard against accidents to personnel and equipment in this modern preparation plant which was designed and built by the McNally-Norton Company in close collaboration with the engineering staff and preparation experts of the Fairview Collieries Corporation.

Loading to Railroad Cars

The prepared coal is loaded to railroad cars through five covered loading booms that can be raised or lowered as necessary to prevent the coal falling long distances. This careful loading safeguards the accurate sizing of Flamingo coal. One man operates the five loading booms and moves the cars during the process of loading.

The Flamingo Mine has track connections to two railroads, the Minneapolis and St. Louis, and the Chicago, Burlington and Quincy. The Minneapolis and St. Louis, which put the first line into the mine at the beginning of operations, hauls the greater portion of Flamingo's production.

The mine has its own track department consisting of a foreman, C. E. Hillman, and a crew of six men who are now kept busy on the maintenance of the six miles of track in the empty-yard, tipple and load-yard. The intricate yard railroad system has five lines running to the boom loaders and includes 34 switches. The empties are set into the empty yard by the railroads and run to the loading booms and then to the weighing scale and load-yard by means of gravity. Men ride the cars from the empty-yard to the loading booms and then from the loading booms to the load-yard where they are left until the railroads haul them out each night.

Weighing the Coal

Every pound of coal produced at the Flamingo Mine is automatically recorded by a Streeter-Amet Track Scale Recorder in charge of Elmer M. Edwards, weighmaster. The weighing function is completely automatic and the cars are weighed in motion. The weight is automatically recorded on tape when the loading wheel of the car hits the trip at the exit end of the scale. The weights of the last three cars run over the scale are always visible on the printed tape.

The sludge and water that pass through the dryer screens of the preparation plant are returned to

(*Continued from page 417*)

Building Air Bases FASTER!

● Bottom-Dump EUCLIDS are helping to complete scores of military air bases in record time — in many cases weeks ahead of the rush schedules set up for these huge jobs. One of the reasons why contractors and engineers prefer Euclids for this work is because of the speed and positive dumping control of Bottom-Dump EUCLIDS.

Hopper doors are opened instantly by air controls so operators can "spot" the load accurately without stopping on the dump or fill. The exclusive Euclid "wheel-wind" closes the doors in a few seconds on the return trip. Time saved by Euclids in dumping heavy loads, plus the ability to move larger loads at higher speeds under difficult hauling conditions, means that urgently needed bases can be ready for use faster.

The EUCLID ROAD MACHINERY Co.
CLEVELAND, OHIO

EUCLID

SELF-POWERED HAULING EQUIPMENT
For EARTH . . ROCK . . COAL . . ORE
CRAWLER WAGONS • ROTARY SCRAPERS • TAMPING ROLLERS

THE EXECUTIVE WHO STOPS TO THINK . . .

Knows that "10% for War Bonds isn't enough these days"

Workers' Living Costs going up . . . and Income and Victory Tax now deducted at source for thousands of workers . . .

Check! You're perfectly right . . . but all these burdens are more than balanced by *much higher* FAMILY INCOMES *for most of your workers!*

Millions of new workers have entered the picture. Millions of women who never worked before. Millions of others who never began to earn what they are getting today!

A 10% Pay-Roll Allotment for War Bonds from the wages of the family bread-winner is one thing—*a 10% Pay-Roll Allotment from each of several workers in the same family is quite another matter!* Why, in many such cases, it could well be jacked up to 30%—50% or even more of the family's *new* money!

That's why the Treasury Department now urges you to revise your War Bond *thinking*—and your War Bond *selling*—on the basis of *family* incomes. The current War Bond campaign is built around the family unit—and labor-management sales programs should be revised accordingly.

For details get in touch with your local War Savings Staff which will supply you with all necessary material for the proper presentation of the new plan.

Last year's bonds got us started—*this year's bonds are to win!* So let's all raise our sights, and get going. If we all pull together, we'll put it over with a bang!

This space is a contribution to America's all-out war effort by

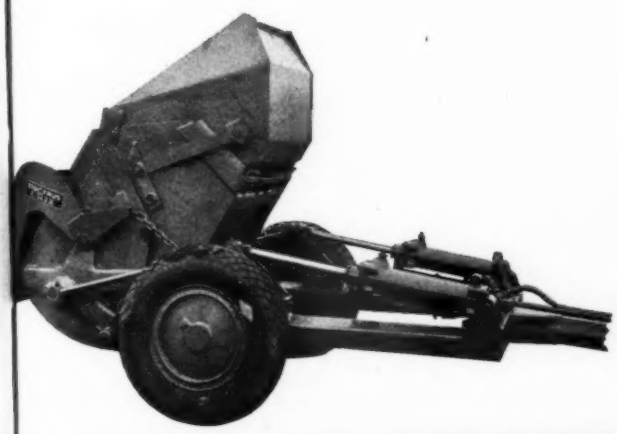
EXCAVATING ENGINEER

you've done your bit
. . . now do your best!

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

GET THE *Most* FROM YOUR SCRAPER...

Your hydraulic scraper is not expendable — keep it in A1 shape. The successful completion of wartime production schedules rests on the ability of your present equipment to stand up to the gruelling task of round the clock operation. Here are some suggestions that may help eliminate breakdown time from your records.



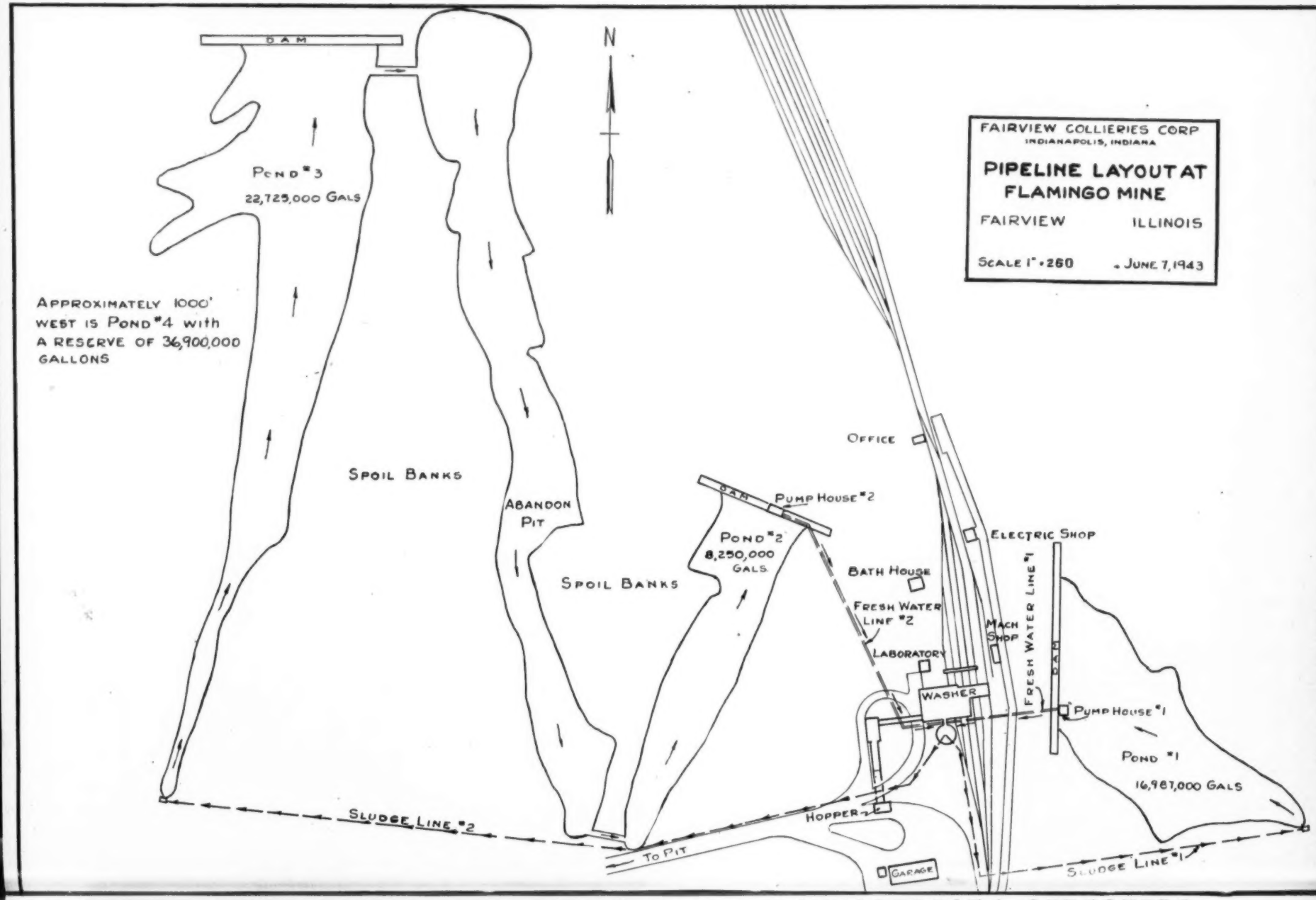
- Watch cutting edge. Build up the blade by welding before it wears to the point where supporting casting is damaged.
- Keep leverage mechanism and pivot pins clean and in proper adjustment for freedom of action in bowl.
- Set apron opening at correct position for the type of soil which is being loaded.
- Make certain that same adjustment of bowl stop is used on both left and right sides to avoid twisting of bowl.
- Check condition of draw-bar pin and safety cable.
- Hydraulic system check-up should be regular routine. Make certain that oil is up to level and system is clear of air.
- Drain the oil when it is dirty. Floating particles wear the pump and valve.
- Keep all hose and pipe connections tight to prevent loss of oil and infiltration of air.
- Have an adequate schedule for lubricating at high-pressure fittings.
- See that all nuts, bolts and cotter pins are in place and tight. Keep tires properly inflated.

Bucyrus-Erie 2-wheel scrapers are built to withstand the grind of triple-shift performance, but even they must have proper maintenance for capacity production over long periods of time. Your International TracTracTor distributor will gladly advise you on proper maintenance and lubrication.

P145C

BUCYRUS ERIE
TRACTOR EQUIPMENT

SEE YOUR INTERNATIONAL TRACTRACTOR DISTRIBUTOR


DAM
POND #3
22,725,000 GALS
APPROXIMATELY 1000' WEST IS POND #4 with A RESERVE OF 36,900,000 GALLONS
N
FAIRVIEW COLLIERIES CORP
INDIANAPOLIS, INDIANA
PIPELINE LAYOUT AT FLAMINGO MINE
FAIRVIEW ILLINOIS
SCALE 1" = 260' - JUNE 7, 1943
OFFICE
SPOIL BANKS
ABANDON PIT
SPOIL BANKS
DAM
PUMP HOUSE #2
POND #2
8,250,000 GALS.
ELECTRIC SHOP
BATH HOUSE
FRESH WATER LINE #2
MACH SHOP
LABORATORY
WASHER
FRESH WATER LINE #1
DAM
PUMP HOUSE #1
POND #1
16,987,000 GALS
SLUDGE LINE #2
TO PIT
HOPPER #2
GARAGE
SLUDGE LINE #1

Flamingo Mine

(Continued from page 412)

the wedgewire de - watering screens. The through product, minus ½ mm sludge and water, is pumped to the top of a settling cone, from which reclaimed water is returned to the jigs under a gravity head of 18 feet. The head is adjustable. The sludge from the cone is pumped to a settling pond.

The water supply and wash water systems for the preparation plant of the Flamingo Mine are co-ordinated. Water for the washing system and to sluice the sludge back to ponds is obtained by damming three valleys between spoil banks on the mine property and drainage of the entire mine property runs into these three ponds for storage. Pond No. 1, about 300 feet east of the preparation plant has a capacity of 16,987,000 gallons of stored water. Pond No. 2, about 800 feet west of the preparation plant, has a storage capacity of 8,250 gallons, and Pond No. 3, about 2,000 feet from the washer, has a storage capacity of 22,725,000 gallons. In addition to these three ponds that are being used there is another pond about 1,000 feet west of Pond No. 3, with a reserve of 36,900,000 gallons of water.

• This cross marks the location of a well that was located on a farm before stripping operations started at Flamingo. The well extends down through the coal bed.

• The mine's Brownhoist dragline with ⅜-yard bucket and 30-foot boom is ditching along the yard tracks from a flat car pulled by Flamingo Mine's 35-ton Vulcan locomotive.

Water and Sludge Systems

When the mine first started operation about 17 months ago all water for the washer plant was furnished from Pond No. 1 and the sludge was washed back into this pond on a continuous pipe circuit. Fresh water was pumped from the west end of the pond and the sludge line was run back to the extreme southeast part of the pond. As the water passed back toward the pump house the sludge was deposited at the bottom of the pond. After almost a year of use Pond No. 1 contained too much sludge for everyday use and this pond was abandoned as the only source of water for the washer. It is now used intermittently with the other ponds, when the water in Pond No. 1 is replenished by heavy rainfalls.

Ponds No. 2 and 3 are separated by an abandoned pit through which the drainage system runs. Fresh water is pumped to the washing plant from the east end of Pond No. 2, at a point where a dam has been constructed. After use, this water and sludge is run back toward Pond No. 3, by gravity. It continues northward in Pond No. 3, about 1,800 feet to a dam, from where it is diverted through a channel to the north end of the abandoned pit. The water continues flowing southward through the abandoned pit, which is about the same length as Pond No. 3, and is then piped to the south end of Pond No. 2 from the north end from where it is pumped back to the washing plant for re-use. The sludge settles out in Pond No. 3 and the abandoned pit and by the time the water gets back to Pond No. 2, it is clear and ready for re-use. (See diagram of the pipe-line system for further details)

George D. Huff, general superintendent of the Flamingo Mine, states that he thinks that there is a possibility that some time in the distant future the fine slurry coal that is deposited in the sludge ponds will furnish a supply of the

finest grade powdered coal for industrial plant boilers.

In addition to rainfall and natural drainage, water in the storage ponds also comes from a system of drainage ditches dug throughout the unworked portions of the company's 2,400 acres of leased land. Water that collects in the operating pit is pumped up over the high wall and into the drainage ditches from where it goes to the storage reservoirs.

The mine personnel constructed the three dams at the ends of the three ponds with the company's Bucyrus-Erie Bullgrader mounted on an International TD-18 Trac-TracTor. Material to form the dams was borrowed from adjacent spoil piles. One of the dams is 500 feet long and has a 35-foot crest and another dam is 300 feet long and has a 25-foot crest.

Electrical System

Flamingo Mine has a very efficient power and electrical system in the mine and the preparation plant under the supervision of Chief Electrician Ellis Maxwell. The mine and plant are operated with purchased power which is transformed at the main sub-station from 33,000 volts to 4,000 volts. Power is distributed to the pit through a system of laterals which extend at 1350-foot intervals toward the pit from a main transmission line. Dead-ended lateral lines are supported every 850 feet on double-armed, guyed poles. This system is protected by an oil circuit breaker that is placed ahead of the power transmission system so that the preparation plant can still receive power in spite of a breakdown in the pit system.

• As supervisor of electrical equipment, Ellis Maxwell planned the pit's electrical layout and has charge of the power system of the preparation plant.

Power is taken beyond the end of the laterals by connecting three 300-foot sections of flexible cable in series through small junction boxes that have disconnects, primary cutouts, and Foy transformers. A high voltage cable 350 feet long is run from each of the three cable junction houses over the high wall and into the pit to switch houses with oil circuit breakers. The lines to the stripper and loader can be connected to any one of the three pit houses, depending upon the location of these machines. A low voltage cable is run from a transformer at each of the three cable junction houses on the high bank over the wall to the pit where it can be used for operating the electric-powered drills and for detonating blasting charges. Either one of these three low voltage cables can also be used, depending upon the location in the pit of the equipment being used at the time. (See illustration of electrical layout of the mine)

The steel pit houses have oil circuit breakers and are mounted on sledges which enable them to be pulled from one location to another. Protective switches that trip the circuit breaker if the doors of the unit are opened by unauthorized persons are a safety feature. Each unit is provided with an ohmmeter and switches for testing ground circuits, and all grounds are tested after any connections have been changed. If the testing indicates abnormal resistance the cause is immediately located and repaired to avoid operating with inadequate grounds.

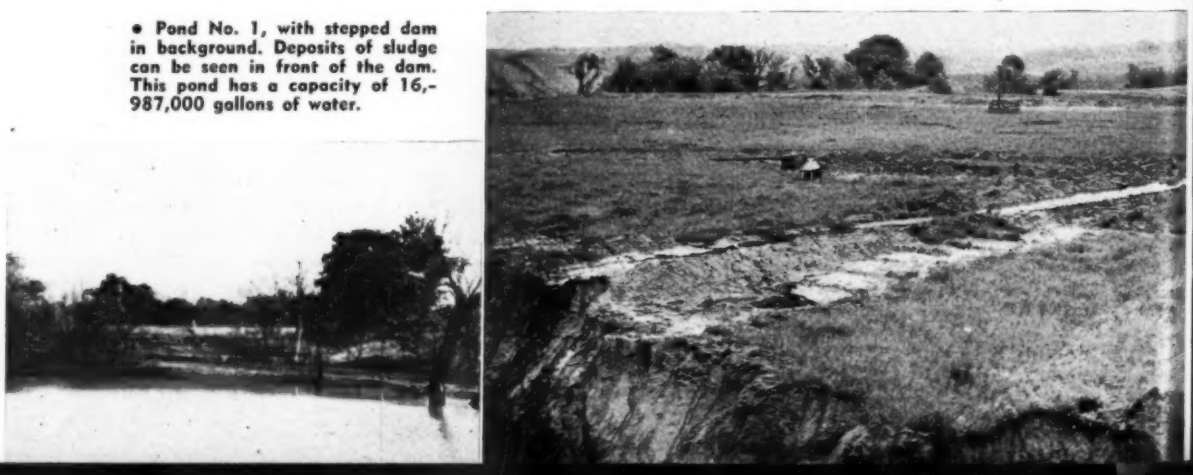
The combined ground circuit for the mine and preparation plant includes a 50-ohm resistor at the main sub-station. In case of a ground fault, the resistor absorbs most of the current and reduces the potential to ground at the point of fault to the range of 90 to 120 volts, thereby minimizing risk to nearby workmen and equipment. Damage from unbalanced currents is avoided by use of fast-acting fault-current relays in the main switch house and power distribution centers.

Westinghouse power equipment and controls are used exclusively on both the stripping and loading shovels. American Steel and Wire Company cable is used exclusively in the Flamingo Mine. A record is kept of all cable performance and several conservation methods are used. Counterbalance cables on

(Continued on page 423)

• A drainage ditch on an unmined area feeds water into one of the storage reservoirs at Flamingo.

• Pond No. 1, with stepped dam in background. Deposits of sludge can be seen in front of the dam. This pond has a capacity of 16,987,000 gallons of water.



HERCULES
TAMPTITE
TAMPTITE
Speeds work - saves time
A Tamptite cartridge is easily, quickly inserted into the bore hole in the usual manner. No wasted man-hours slitting cartridges. No loose, spilled powder to worry about. Then—

TAMPTITE
Packs snugly
gives better breakage
You tamp a Tamptite cartridge in the usual manner. It packs evenly, snugly—leaves little air space—concentrates the charge for good breakage, faster mucking.

INCREASED TONNAGE, together with savings in valuable man-hours, can be gained by using your regular Hercules explosives in the new Tamptite* cartridges. Tamptite shells are convenient, easy to use. They eliminate the mess and trouble of slitting cartridges. They compress in the bore hole with a compactness that assures good breakage. And, the better breakage, of course, means easier, faster mucking. In fact, Tamptite speeds up your entire mining cycle. On your next order, specify Hercules in Tamptite cartridges.

HERCULES EXPLOSIVES

HERCULES POWDER COMPANY
INCORPORATED
972 KING STREET • WILMINGTON • DELAWARE

*Reg. U. S. Pat. Off. A-99

NOT in the *Contract*

A negro in the Solomons was told by his Colonel he needed a Jap prisoner very badly—so much so that if he could bring him one that day he would let him use his jeep, with a 24-hour leave.

Late that afternoon sure enough the negro brought in a Jap. The pleased Colonel kept his word — "OK, Sam! Take the jeep — she's yours for 24 hours."

"Where bouts is she, Colonel?"

"Right in front of you. Can't you see?"

"You-all mean this here automobile?"

"Sure."

"Ah, now, Colonel! I thought a jeep was a female Jap!"

Jane: "Jim proposed to me last night, and I'm sore at him."

Josephine: "What makes you so mad?"

Jane: "You ought to have heard what he proposed."

The absent-minded professor walked into the village barber shop, sat down in the chair and requested a haircut.

"Certainly, sir," said the barber. "Would you mind taking off your hat?"

The professor hurriedly complied. "I'm sorry," he apologized. "I didn't know there were ladies present."

An insurance agent was filling out an application blank.

"Have you ever had appendicitis?" he asked.

"Well," answered the applicant, "I was operated on, but I have never felt quite sure whether it was appendicitis or professional curiosity."

Wanted: A place to show her wares by an antique lady with a Spanish chest and other odd things.

"I ran out of gas coupons for my car, Pop—could I use the bulldozer to take Bessie to the dance tonight?"

Husband: "Do you know, honey, if I had to do it all over again, who I'd marry?"

Wifey: "No, who?"

Husband: "You."

Wifey: "That's what you think!"

A true music lover is a man who upon hearing a soprano in the bathroom, puts his ear to the keyhole.

Picking His Spots

"I'm my own bouncer and I'm hard," declared the tough bartender. "You gotta be to stay in this business. Look, this guy comes in last night and I don't like his looks, an' I didn't like the way he ordered his beer; so I lets him have it with the old bungstarter. Down he goes, so I takes him by the collar and the seat of the pants an' throws him out into the street, the big bum — an' then I throws his crutches out after him."

"I am Brave Eagle," said the Red Indian chieftain, introducing himself to the paleface visitor. "This is my son, Fighting Bird."

"And here," he added, "is my grandson, Four-Engined Bomber."

A couple of selectees were discussing their company officers. "You know," said one, "I feel like I'd like to punch that hard-boiled top sergeant in the nose again!"

"Again?"

"Yes, again — I felt like it yesterday."

A Chinaman had a toothache and phoned a dentist for an appointment.

"Two-thirty all right?" asked the doctor.

"Yes," replied the Chinaman. "Tooth hurtee all right. What time I come?"

"We had a bad explosion at our house last night. Somebody told Dad the new maid was dynamite; so he decided to investigate. As soon as he touched her, she exploded, Mother went through the roof, grandma hit the ceiling, and Dad went all to pieces."

POWER • SPEED • ACCURACY
IN DRAGLINE OPERATION
...HAVE PROVEN KOEHRING
ABILITY ON WAR JOBS
Power... Speed... and Accuracy ...are the essential requirements in wartime construction and of paramount importance in dragline operation. Koehring Draglines are reliable because they have the potentialities ... speed ... power ... and accuracy ... all so vital to wartime construction. Adverse working conditions in drainage districts and on defense projects have proven that the Koehring Dragline can be depended upon for essential dragline operation.
KOEHRING COMPANY
Milwaukee, Wis.
DEPEND ON YOUR KOEHRING DISTRIBUTOR
to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.
KOEHRING
HEAVY DUTY
HEAVY-DUTY CONSTRUCTION EQUIPMENT

Notes from the manufacturers

Stewart-Warner Company, Chicago, Illinois, recently held their first meeting of the newly-elected board of directors and Albert R. Benson, assistant secretary and assistant treasurer, was elected corporation secretary. He replaces Lynn A. Williams, Jr., who continues as vice-president. All other corporation officers were re-elected.

Euclid Road Machinery Company, Cleveland, Ohio, have announced that Virgil L. Snow, assistant chief engineer has been assigned new duties of industrial engineer. Mr. Snow will work with mining companies, quarries and other industrial concerns in the application, design and maintenance of Euclid equipment.

The Thomas Laughlin Company, Boston, Massachusetts, recently received the Army-Navy production award for outstanding production of wire rope and chain fittings for ships of the Navy and Merchant Marine.

Asphalt Institute, New York City, announce the establishment of a Dallas, Texas, office with the appointment of Hugh A. Wallace, District Engineer for the territory comprising Texas, Oklahoma, and Arkansas.

The Sullivan Machinery Company, Michigan City, Indiana, announce the company has been awarded the Army-Navy "E" for production excellence in the ceremony held May 14. The company also announces the recent resignation of John A. Haddock, formerly vice-president in charge of engineering and sales, to become president of the Farrel-Birmingham Company of Ansonia, Conn. The company also announces that O. J. Neslage has been appointed general sales manager and that Mr. J. N. Rolston has been appointed assistant general manager.

H. K. Porter Co., Inc., Pittsburgh, Pa., announce they have purchased the Quimby Pump Company, Newark and New Brunswick, New Jersey, according to T. M. Evans, president of the Pittsburgh firm. H. K. Porter is the manufacturer of industrial locomotives and chemical processing equipment.

F. W. Dodge Corporation, New York, New York, announce the appointments of Ralph M. Hairston and Howard M. Thompson as executive assistants, respectively, to Irving W. Hadsell, vice president in charge of the Construction News Division, and Chauncey L. Williams, vice president in charge of Sweet's Catalog Service Division.

Elwell-Parker Electric Co., Cleveland, Ohio, announce the appointment of C. B. Cook as vice president in charge of Advertising, Sales Promotion and Export Sales. Mr. Cook has been with the company for the past 28 years. Mr. Cook is a prominent figure in his community.

Brown Instrument Co., Philadelphia, Pa., announce the appointments of two new vice-presidents, George M. Muschamp in charge of engineering and Paul L. Goldstrohm as vice-president in charge of production. Mr. Muschamp has been with the firm for a period of 12 years and Mr. Goldstrohm for 20 years.

Westinghouse Editorial Service, East Pittsburgh, Pa., announce Dean Harvey, a materials specialist, will succeed H. J. Ball as president of the American Society for testing materials for a one-year term. Mr. Harvey has been with the company for more than 30 years. John R. Townsend was elected vice-president.

S. K. F. Industries, Philadelphia, Pa., announce the appointment of Robert R. Zisette as general sales manager of the company. Mr. Zisette has been with the company since 1921.

New trade literature

Title: "How To Make Your Safety Equipment Last Longer"

Subject: Covering every type of personal protective equipment in protective hats, gas masks, respirators and gas instruments through the list to safety clothing. This well-illustrated publication details the practical "do's and don'ts" of safety equipment care for key personnel in a form readily adaptable for instruction of equipment users. Illustrated throughout by marginal drawings pertinent to the text, the booklet even deals with various methods of sterilization for masks and respirators.

Where to get: Mine Safety Appliances Company, Pittsburgh, Pennsylvania, free upon request.

Title: "Lady Will You Give A Lift?"

Subject: An easily-understood book of instruction to help companies break in women drivers of industrial trucks. Illustrated with over 20 pictures, the manual tells the prospective woman operator how to run the truck, gives pointers on how it should be cared for and explains the importance of the job. With the aid of the manual, women can be taught to drive industrial trucks in as short a time as one day.

Where to get: Elwell-Parker Electric Company, Cleveland, Ohio.

Title: "How To Lengthen The Life of Mechanical Rubber Goods"

Subject: A booklet containing 21 pages of handy maintenance information for users of industrial rubber equipment which presents a series of worthwhile rubber conservation suggestions by the Pioneer Rubber Mills. The booklet concludes with a new idea in conservation, the marking of industrial rubber in daily use by means of attractively designed tags.

Where to Get: Pioneer Rubber Mills, 353 Sacramento Street, San Francisco, California. Free upon request.

ALL TRAILERS ARE NOT ALIKE!

Ask the salesman these questions:

- Are the beams strong enough to carry the rated load without sagging after several months' service?
- Does the frame have enough cross members?
- Are the bearings, axles and wheels of ample size and weight to carry the occasional overload and stand up under road shock?
- Are the radius rods, brake cross shafts and other points requiring lubrication bronze bushed?

These are just a few of the things to check before planning on your post-war trailer. But before you buy any trailer, check into the exclusive design of Jahn Trailers.

JAHN *Heavy Duty* TRAILERS
in Capacities from 5 to 100 TONS

C. R. JAHN CO.
1349 W. 37th Pl., Chicago, Ill.

"Come to Trailer Headquarters"

Flamingo Mine

(Continued from page 418)

the stripper are changed from end to end about every three months. The hoist-cable, which is 2⅛ inches in diameter stretches after use and is reduced to about 2 inches through the stretching process. This used cable that decreases to 2 inches in diameter is cut and used for crowd and retract cable, after the ends are zinced.

Safety Measures

Superintendent Huff is very safety conscious and it is a credit to his efforts that there have been no serious accidents of any kind at the Flamingo Mine in the 27 months since this mine was started. Each of the men, both in the pit and in the preparation plant, including supervisors, are required to wear plastic safety helmets. Many of them wear safety shoes and plans are being made at the present time to have the company pay the men the difference in cost between regular and steel plate-toes safety shoes. Fire extinguishers are located in all possible places where there may be a fire hazard and an extinguisher is part of the equipment on each of the hauling trucks. Each extinguisher is fastened to its permanent location with a lead safety seal so that if the extinguisher is used the seal must be broken, indicating that the extinguisher is probably empty. In this way a check is kept to see that all extinguishers are kept full and ready for immediate use in case of an emergency.

Over 50,000 trees, maple, ash, walnut, locust and a few pine seedlings, were planted on soil that had finished settling on spoil piles this year. The tree seedlings were planted on the sides of the spoil piles not closer than six feet from the peak or depth. It is estimated that eventual erosion will trim six feet off the peaks of the piles and fill about six feet in the valleys between piles. The trees were bought from the state at cost for $350, and labor of planting the trees, much of which was women, cost the mine an additional $600.

POSITIONS WANTED

Address all box numbers c/o EXCAVATING ENGINEER South Milwaukee, Wis.

ALL-AROUND OPERATOR

Can operate any kind of machine, large or small. Have had experience in quarry, ore and coal stripping. Prefer quarry or mining. Familiar with grading work. Operate steam, diesel, gas or electric. Can do own repair work. Will go anywhere. Box 9211

CRANE AND DERRICK OPERATOR

Twenty-two years experience as crane and derrick operator. Very familiar with Ohio crane, steam and diesel. Willing to go anywhere. Now located in Ohio. Box 9210

EXPERIENCED OPERATOR

Shovel, crane, pull shovel and dragline operator. Capacities from ½ yd. to 5 yds. Steam, gasoline, diesel and electric. Can operate Bucyrus-Erie 120-B, Bucyrus-Monighan 5-W, Koehring, Northwest, P&H, Lima and Bay City machines. Also locomotive cranes. Prefer Bucyrus-Erie. 25 years experience. 2 years in South America. Willing to go any place in the U.S.A. or South America. Not in the draft. Can overhaul and repair all makes of Machines. Now located Wisconsin. Box 9212

Guest (to host in new house): "Hello, old pal, how do you find it here?"

Host: "Walk right upstairs and then two doors to the left."

Designed for Saving Steel Time Money

IF YOU will chart the service record of Preformed "HERCULES" *(Red-Strand)* Wire Rope—as so many have done—you, too, will have definite proof of the savings that its use provides.

You will find a saving in steel because of its longer life; by the same token you also save time, as replacements are less frequent. And the sum of the two savings is greater economy.

The consistent top-flight performance of Preformed "HERCULES" *(Red-Strand)* Wire Rope is not a matter of chance. Like all wire rope bearing this well-known name, it is made of acid open-hearth steel wire . . . selected by rigid tests to make sure that it meets our exacting requirements. It is then carefully manufactured according to sound fundamental principles.

The more hours of work you can get out of every pound of wire rope you use, the more steel you save for other vital war purposes. Regardless of the kind or make of wire rope you now have, it will not be able to give you the full service of which it is actually capable unless it is handled correctly and operated under proper working conditions. For further information on the proper use, care and application of wire rope, feel free to consult our Engineering Department.

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A. LESCHEN & SONS ROPE CO.
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SEATTLE 3410 First Avenue South

TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. If no change in copy is desired, three continuous insertions are offered for the price of two. Read these instructions carefully. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Count your own copy to save delay. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January issue closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

SMALL SHOVELS, CRANES AND DRAGLINES UP TO 2¼ YDS.

FOR RENT
1 yd. Bucyrus-Erie 32-B
1¼ yd. Lorain 69
Diesel shovels, cranes, clamshells, and draglines.
393 Brookline Street,
Newton Center, Mass. Tel. LASell 4300

Type B2, high lift, high cats Bucyrus-Erie steam shovel in good condition.
DOOLEY BROS., INC.
39 George Street Roxbury, Mass.

LARGE SHOVELS, CRANES AND DRAGLINES 2½ YDS. AND UP

For prompt sale—used 175-B Ward-Leonard electric shovel 65' boom, 42' handle, 7 yard coal loading dipper or could handle 4 or 5 yard stripping dipper. Has operated about one-third of time since shipment, is well maintained and excellent operating condition. Can be demonstrated, reasonably priced. Ready for immediate delivery. Box 2980

BUCYRUS-MONIGHAN 2T Walker—Bucyrus-Erie 37B Gas—Bucyrus-Erie 30B Steam. Location northwest. Box 2969

FOR SALE

BUCYRUS 320-B stripper, steam. 90 ft. boom, 58 ft. dipper sticks, 7½ yd. dipper.

BUCYRUS 225-B stripper, steam. 80 ft. boom, 56 ft. dipper sticks, 5 yd. and 7 yd. dippers.

BUCYRUS 27D, 2 yd. horizontal loader, steam. Caterpillar mounting.

BUCYRUS 50B shovel, steam, caterpillar mounting. 28 ft. boom, 18 ft. dipper sticks, 1¾ yd. dipper.

MARION 125 stripper. Electrically operated Ward-Leonard controls, 1000 ft. conductor cable, 55 ft. boom, 36 ft. dipper sticks, 2½ yd. dipper. Truck mounted each corner.

2—MARION 490 combination shovel & dragline, electrically operated, standard boom and dipper sticks, 2¼ yd. dipper and dragline bucket. Rebuilt and guaranteed.

MARION 250 stripper, steam. 75 ft. boom, 52 ft. dipper sticks, 3½ yd. dipper. Truck mounted each corner.

2—BUCYRUS 5W WALKER draglines. 100 ft. boom, 5 to 7 yd. buckets. Powered by 300 H.P. Fairbanks-Morse Diesel engines.

BUCYRUS-MONIGHAN WALKER, 87 ft. boom, 3 yd. bucket, Atlas Diesel engine.

BUCYRUS 30B combination shovel-dragline, standard boom and dipper stick, 1¼ yd. dipper, 40 ft. dragline boom, 1 yd. bucket. Powered by Atlas Diesel engine.

R. C. STANHOPE, INC.
60 East 42 St. New York, N. Y.

MISCELLANEOUS EQUIPT.

25 ton Brownhoist gas crawler crane
12 ton Orton locomotive crane
40 ton Vulcan saddle tank locomotive
16 ton Vulcan 36" gauge gas locomotive
5 ton Plymouth 36" gauge locomotive
No. 1 Vulcan hammer, Standard base
MACKINTOSH ENGINEERING CO.
2907 Library Ave. Cleveland 9, Ohio

Will rent, sell or trade for 5 yd. Cat. & scoop, one R ½-yd. Insley comb. shovel & dragline complete with fairleads & ⅝ yd bucket. Good condition. Miller Excavating Co., 4961 Center, Omaha, Nebr.

ARMSTRONG 50-BE electric blast hole drill, 3 phase, 60 cycle, 440 volt, steel frame, wheel mounted, self-propelling. Steel derrick with shock absorber for wire line. Good operating condition. Price without tools $1200.00 cash, F.O.B. Central Tennessee. Box 2928

PRICED TO SELL
Portable conveyor, self propelling, 30' long 18" belt concave, Barber-Greene, 3 phase electric motor 220 AC. First class condition. Belt new. Located Wisconsin.
Box 2979

One 225-B Bucyrus shovel boom in good condition. Price $1500. Robinson Coal Company, Pleasanton, Kansas.

FOR SALE OR RENT
1—P&H No. 700—2—P&H No. 600; each with Trench Hoe, Clamshell and Dragline attachments. Austin Trencher 42-15. P&H Backfiller.
1—No. 314 Sullivan Air Compressor.
1—P&H No. 700 Trench Hoe Boom.
F. Piacente & Co. Chicago Heights, Ill.

DRAGLINE BUCKET
8 cu. yd. medium weight Page automatic dragline bucket, with four teeth, 65" cutting width, complete with all chains and accessories. Used only three months. Located Southern Indiana. Box 2974

315'—2-stage Davy compressor direct connected to D-13000 Cat Diesel. Semi-trailer mounted to Chevrolet truck tractor. Includes 1942 Cleveland wagon drill, five 55 lb. Thor rock drills, hose and steels. Rebuilt. Ceiling—$9435. Your cost—$8900.

LeTourneau heavy duty Model H-5 Rooter. Rebuilt—$1275.

Grayco Luber greaser outfit. Model LU-100. Three grease compartments with pumps, gasoline engine, compressor, hose and reels. On skids. New 1942—$1275.

1½-yd. P&H shovel, Model 705, Serial No. 4854. New in 1936. 130 H.P. Caterpillar diesel. Rebuilt and guaranteed. Can furnish new claim or dragline boom with priority. Box 2983

One Caterpillar Diesel 40 Tractor in good condition: One Cedar Rapids Crushing Plant, 9" by 24" Jaws, 16" by 24" Rolls, bucket elevator, mounted on Pneumatic Tires: One 60 Caterpillar Tractor & Bulldozer, fair condition: One Schinck Loader to fit Farmall Tractor, ⅜ Yard Bucket like new.
MARTIN COUNTY NATIONAL BANK
Fairmont, Minn.

Shovel front end for 50-B Steamer. 32 ft. boom, 21 ft. 6 in. handle, 2 yd. rock dipper. Central location. Box 2967

FOR SALE
Pumps, All Sizes
Power Units
Light Plants
150 HP Fairbanks-Morse Engine
Buckets, All Types
27-E Pavers
2 Bag Mixers
Boilers
2—12 yd. Euclid caterpillar wagons
3—8 yd. Allis-Chalmers caterpillar wagons
Conway Mucker
Tunnel Loader
Concrete Placer
1¼ yd. Thew caterpillar, Steam
50-B Bucyrus Combination
Booms
Derricks
¾ yd. Northwest Crane, Model 105
15 Inch Dredge Pipe Fittings
Tanks, 8,000 and 10,000 Gallon
15 Inch Dredge Pipe Fittings
Road Forms
Gasoline Pumps and Power Units
Backfillers
STIERS BROS. CONSTRUCTION CO.
2944 Magazine St. St. Louis (6), Mo.

CRANE BOOM
100-foot boom (4 25-ft. sections) for Model 700 P&H. Good as new—bargain $900.00. Inquire Kuesel Coal Co., City Hall Square, Milwaukee, Wis. Phone MArquette 1500.

FOR SALE
1—Model 8 Athey Mobiloader, with 6 ft. bucket, and with Bulldozer attachment, like new, used only a few hours, for mounting on Caterpillar D-8 tractor.
Wm. H. Ziegler Co., Inc. Duluth, Minn.

FOR LEASE
Acreage of Brazil Block, excellent quality, light overburden, above drainage, good local market, and within reasonable haul of three large market centers. Will lease coal or contract stripping. Box 2981

WANTED

WANTED
10 Side Dump Cars, Standard Gauge. Approximately 20 ton capacity for hauling quarry run limestone rock. Box 2982

WANTED
Twin rope crowd shovel front end equipment for Bucyrus-Erie 10-B. Box 2978